

## **Attachment E**

### **Health and Safety Plan, Changes and Issues**

## **Changes to the Health and Safety Plan**

## 1. Changes to the Health and Safety Plan

As a result of changing conditions and new information gained in the field through analytical activities, changes were made to the Health and Safety Plan. The changes related to lead sampling, levels of protection, and use of personal protective equipment. A memorandum concerning detection of cristobalite interference in laboratory results was also incorporated. (See Attachment E).

### 1.1 Lead Sampling

Air sampling to characterize for exposure of personnel to lead was discontinued on July 24, 2002, because lead in air concentrations consistently presented below the OSHA Action Limit of 30 ug/m3. (29CFR 1926.62).

### 1.2 Level of Protection

Levels of personal protective equipment (PPE) were changed to reflect exposure measurements. An addendum to the Health and Safety Plan was prepared to address this on September 17, 2002. The table below presents the PPE assignments by task, pursuant to original and the amended Health and Safety Plan.

### 1.3 Personal Protective Equipment (PPE) By Task

<i>Location</i>	<i>Task</i>	<i>Original PPE</i>	<i>Revised PPE</i>
Exclusion Zone	1. Surveying and prep of previously cleaned areas	Level C- ½ face	Level C- ½ face
	2. Surveying and prep of areas not previously cleaned	Level C PAPR	Level C PAPR
	3. Vacuuming with non-HEPA-filtered equipment	Level C PAPR	Level C PAPR
	4. Vacuuming with HEPA-filtered equipment in previously cleaned areas	Level C- ½ face	Level C- ½ face
	5. Wet wiping following non-HEPA vacuuming	Level C- ½ face	Level C- ½ face
	6. Wet wiping following HEPA vacuuming	Level D+	Level D+
	7. Cleaning equipment using air and vacuum	Level C PAPR	Level C PAPR
	8. Removing/ changing vacuum bags and filters	Level C PAPR	Level C PAPR
	9. Re-cleaning units w/HEPA vacuuming and supporting personal air sampling results	New Task	Level D+
	10. Re-cleaning units w/ non-HEPA vacuuming	New Task	Level C- ½ face
	11. Re-cleaning units w/HEPA vacuuming without supporting personal air sampling results	New Task	Level C- ½ face

### 1.4 Use of Goggles

Goggles were assigned for Levels D and D+ because of concerns that irritation of employee's eyes might result from airborne fiberglass. Once it was determined that eye irritation was not occurring, safety glasses were substituted.

## **Health and Safety Issues**

## **1. Health and Safety Issues**

### **1.1 Electrical Concerns**

All areas of the building were inspected to ensure that no electrical concerns posed a threat to the safety of employees. In the Food Exchange, live, loose hanging electrical wires were found. Electricity at the panel box was shut off and the wires in question were taped.

### **1.2 Building Repairs**

A damaged hand rail in the Liberty Street stairwell was reinstalled to ensure the safety of personnel. All other repairs made prior to commencement of the work related to building access.

### **1.3 Building Access**

The only access concern related to broken windows in the Chiropractor's Office. In order to prevent unauthorized access, which could potentially pose risks to both public health and to equipment used in the study, plywood panels were installed over the broken windows.

### **1.4 Rodent Infestation**

In the process of inspecting to identify safety concerns, evidence of rodent infestation was discovered (droppings). The building owner was advised of the problem and contacted an exterminator.

### **1.5 Personal Monitoring**

Every morning, the Site Health and Safety Officer calibrated the personal pumps. The initial flow, pump start time, pump serial number, date, location of pump, and sample number were recorded. Personal pumps are typically worn by employees to collect air samples that are representative of what the employees are experiencing while working. Given the space constraints of the work areas and the number of parameters to be measured, the majority of exposure measurements were made using area samples.

Pumps for the three parameters were mounted on five-foot tripod stands, in lieu of being worn by the employees. The Site Health and Safety officer collected media blanks at a rate of 10% of samples. At the end of the day, the stand was disassembled and the final flow rate and finish time were recorded. The total volume was calculated and the samples were packaged and forwarded to EPA's contracted laboratory. The laboratory is accredited for analysis of lead and silica by the American Industrial Hygiene Association and by the NVLAP for asbestos. The air samples were analyzed by the laboratory for asbestos, using one or both of the following procedures: PCM /TEM.

Sampling for airborne lead ceased on July 24, 2002, after consistent results of non-detectable

concentrations. Sampling for asbestos and silica continued throughout the project to the extent commensurate with the task and crew size.

## **1.6 Work Zones**

Upon commencement of the study, the building condition was assessed for the purpose of establishing work zones. Determination of work zones was made with consideration of boundaries that would maximize work productivity while facilitating pre and post sampling efforts. The demarcation of zones was accomplished to ensure the health and welfare of personnel and third parties. The Site Health and Safety Officer supervised the demarcation of zones. Space at the site was extremely limited, forcing continuous re-designation of the support zone, contamination reduction zone and the personnel decontamination area throughout the project. At any given time, the exclusion zone consisted of the area or areas then being cleaned; the contamination reduction zone and the personnel decontamination zone changed accordingly. Typically, because the walls of the apartment units offered inherent boundaries, the room or area configuration served as the delineation.

### **The Support Zone**

As noted previously, space constraints at the site presented difficulty, resulting in ongoing re-designation of work zones. The purpose of the support zone is to provide an area for support and communications to operations personnel. Initially, the support zone was designated as an area outside of the building, adjacent to the entrance vestibule on Cedar Street, while office functions were accomplished from a hotel several blocks away. The site Health and Safety Officer conducted daily safety meetings in the outdoor area to establish project procedures and controls, and to communicate changes. After being cleaned, the entrance vestibule was designated as part of the support zone. A third support zone was located on the second floor after it had been cleaned. This support zone occupied the north end of the enclosed hallway area between the Chiropractor's Office and the Mattress Store, and extended into apartment 2B, where an on-site office was established. (This unit was cleaned and sampled prior to use.) The outdoor area, the vestibule and the second floor area were all utilized as support zones until completion of the project.

### **The Exclusion Zone and The Contamination Reduction Zone**

The exclusion zone was identified as the areas of the building then requiring cleaning. These areas were designated with a unit number or a common area reference. All personnel, tools, and small equipment passed into and out of the exclusion zone through the contamination reduction zone. The purpose of the contamination reduction zone is to provide a defined area for reduction of any contamination potentially sustained in the exclusion zone. The contamination reduction zone was relocated appropriately as the exclusion zone focal area changed.

The contamination reduction zone was initially established in the stairway landing area, near the elevator, adjacent to the vestibule on the first floor. Personnel suited with personal protective equipment in the vestibule. They unsuited in the area at the bottom of stairs, before re-entering the vestibule. As the job progressed, the contamination reduction zone was located adjacent to the areas being cleaned.

**The Personnel Decontamination Area**

The personnel decontamination area was located directly inside the contamination reduction zone. In this area, personnel disrobed of personal protective wear that was subsequently bagged and disposed. The personnel decontamination area was supplemented with other safety precautions such as: a portable eye wash station, a first aid kit and fire extinguishers placed at various locations through out the building.



**WRS INFRASTRUCTURE & ENVIRONMENT, INC.**

**SITE-SPECIFIC HEALTH AND SAFETY PLAN**

**USEPA REGION II  
Emergency Response and Rapid Response Service**

**WTC Pilot Cleaning Evaluation  
110 Liberty Street  
New York, NY**

*Submitted to:*

**USEPA REGION II**

*Prepared by:*

**WRS INFRASTRUCTURE & ENVIRONMENT, INC.  
925 Canal Street, Suite 3701  
Bristol, PA 19007**

WRS Project Number: 501060

Document No. 501060-001





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## **APPENDICES**

**APPENDIX A HEALTH AND SAFETY FORMS**

**APPENDIX B HEAT STRESS**

**APPENDIX C WRS LOCKOUT/ TAGOUT SOP**

**APPENDIX D WRS FALL PROTECTION SOP**

## 1.0 INTRODUCTION

### 1.1 Purpose, Scope and Applicability of the Site Specific Health and Safety Plan

Purpose of this site specific Health and Safety Plan (HASP) is to identify anticipated hazards and the control measures to be implemented at the **WTC Pilot Cleaning Evaluation** in New York City, hereafter known as the Site. The procedures presented in this HASP are based on the best available information at the time of the plan's preparation, and are intended only for the activities described in this plan.

The Plan applies to all WRS Infrastructure & Environment, Inc. (WRS) employees, and subcontractor employees. All personnel prior to entering the exclusion zone or contamination reduction zone (decontamination zone) must review and sign this plan. All personnel on site shall be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards of the project tasks/operations. This HASP summarizes those hazards in **Section 4.0** and defines hazard control measures planned for the site.

All visitors entering the contamination reduction zone and exclusion zone at the site will be required to read and verify compliance with the provisions of this HASP. In addition, visitors will be expected to comply with relevant OSHA requirements. Visitors will be expected to provide their own personal protective equipment unless the USEPA specifies otherwise. In the event that a visitor does not adhere to the provisions of this HASP, he/she will be requested to leave the work area.

The requirements and protocols cited in this plan were developed in consideration of current safety standards as defined by EPA/OSHA/NIOSH, health effects and standards for known contaminants, and procedures designed to account for the potential for exposure to unknown substances. Specifically, the following reference sources were consulted in developing this plan:

- OSHA General Industry and Construction Standards.
- EPA Standard Operating Safety Guides.
- NIOSH/OSHA/USCG/EPA Occupational Health and Safety Guidelines.
- NIOSH Pocket Guide to Chemical Hazards.
- EPA Draft Work Plan
- EPA Provided Sample Analytical Data

### 1.2 Revisions to the Plan

Revisions to this plan may be made in response to changes or unexpected conditions not described in this Plan. All revisions to this plan shall be documented on a *Field Procedures Change Authorization form* (Appendix A), approved by the WRS H&S Manager.

## 2.0 KEY PERSONNEL AND RESPONSIBILITIES

### 2.1 Key Personnel

The following personnel have principal responsibility for the implementation , maintenance and oversight of health and safety measures during site activities.

Job Function	Name	Phone	Alternate Phone
WRS Response Mgr.	Scott Wilhelm	610-220-8481	
WRS Program Mgr.	Brad Cunningham PE	267-540-0048	215-796-0337
WRS H&S Mgr.	Doug Nelson CIH, CHMM	770-469-6522	678-296-1267

### 2.2 Responsibilities

#### 2.2.1 Response Manager

The **Response Manager** is responsible for health and safety "performance" in the field. The Site Response Manager can temporarily halt work at any time if, in his/her opinion, it is necessary to protect the health and well being of site workers or the general public. Specific responsibilities of the Response Manager include:

- Directing site activities in accordance with the HASP.
- Being aware of and complying with all applicable federal, state, and local occupational health and safety regulatory requirements.
- Ensuring that resources called for in the HASP and Work Plan/Operations Plan are on site and operational.
- Verifying that all permits, supporting documentation and clearances for a given task (e.g., utility surveys, health and safety plan, confined space entry permits) are in place.
- Informing the appropriate site management and safety personnel of the activities to be performed each day.
- Providing technical advice during routine operations and emergencies.
- Handling field emergency response situations that may arise.
- Correcting unsafe acts and conditions.
- Participating in pre-job and daily safety meetings.

#### 2.2.2 Site Safety and Health Officer (SSHO)

The **Site Safety and Health Officer (SSHO)** has responsibility for ensuring that provisions of each HASP are implemented in the field by all WRS employees and subcontractor employees. The SSHO must be trained to implement the requirements in the site specific HASP, including the correct use of monitoring instruments, health and safety criteria for the site, documentation of monitoring results, and actions to take if site conditions change.

The designated SSHO shall continuously evaluate the adequacy of prescribed health and safety procedures and levels of protection against the actual conditions encountered in the field. If an obvious discrepancy exists between the realized hazard(s) and the level of personal protective equipment (either too much or too little), the SSHO shall immediately bring the situation to the attention of the WRS Health and Safety Manager (HSM). With the concurrence of the HSM and the Response Manager, the SSHO shall take appropriate corrective action. The SSHO has final on-site authority for all matters specifically related to worker health and safety, and emergency situations that require immediate action, including the authority to temporarily cease operations. Additional responsibilities of the SSHO include:

- Monitoring site activities for unsafe acts and conditions and initiating their correction.
- Monitoring project and site activities for conformance to the site specific HASP.
- Overseeing confined space entries and ensuring that all confined space entries are done in accordance with the requirements found in the WRSIE standard operating procedures (SOP's) for confined space entry.
- Performing on-site air monitoring and personal sampling as specified in the site specific HASP.
- Calibration of instruments.
- Maintenance of health and safety equipment and supplies.
- Ensuring that all work-related injuries and illnesses are properly treated and investigated.
- Conducting safety briefings and daily safety meetings.
- Maintaining documentation in support of the HASP.
- Participating in a pre-job safety briefing with project personnel to discuss anticipated hazards and their control measures.

### 2.2.3 WRS Health and Safety Manager (HSM)

The **WRS Health and Safety Manager (HSM)** shall be responsible for implementing an effective hazardous waste operations health and safety program. The HSM shall have the requisite authority to implement the procedures set forth in the WRS Health and Safety Manual for Hazardous Waste Site Activities, including the authority to temporarily halt work on a project if necessary, to protect employees' safety or health. The HSM may delegate certain duties to the SSHO or to other WRS personnel, but shall be ultimately responsible for the following:

- Overseeing the employee medical surveillance program and interacting with examining physicians as required
- Investigating site histories, performing site characterizations, and assessing site/task specific hazards.
- Developing or assessing task specific monitoring procedures, action levels, levels of personal protective equipment (PPE), and health and safety requirements for the site and the HASP.
- Performing periodic site inspections/audits.
- Following to resolution all deficiencies noted during site inspections. and,
- Resolve "level of care" conflicts that may arise during conduct of the project.

### 2.2.4 Foreman, Operators, and Technicians

All site personnel share responsibilities for health and safety. Specific duties include:

- Conducting work in accordance with the HASP.
- Participating in daily safety meetings/planning.
- Prompt reporting of all incidents and potential health and safety-related problems.

### **3.0 SITE AND PROJECT DESCRIPTION**

#### **3.1 Site Description**

The Site is located at 110 Liberty Street. It is five stories with 12 residential and six commercial spaces. It has been unoccupied since 9/11/01. The building was severely impacted in the WTC collapse. Dust and debris were deposited in the building, windows were blown out, as well as skylights. Residential spaces, the basement and the roof of the building were professionally cleaned shortly after the collapse. Two of the commercial spaces have “inches” of dust and all residential spaces have experienced varying degrees of dust re-deposition.

Rental spaces range in size from 1,000 to 1,300 square feet. They are open in design and consist of a kitchen, bathroom and sleeping area. Each space is heated by an individual hot water baseboard system. Window or roof mounted air conditioners are present in the residential space, central air systems are present in commercial spaces Unit 1 and 2. Rental spaces are accessible through from Liberty and Cedar Streets through common hallways. Floors are accessible via an elevator and stairs. Each floor has a trash compactor room and utility room. A laundry room is located on the 2<sup>nd</sup> floor. The basement contains the building trash compactor, elevator well, electric motor rooms, preparation and storage areas for the Chinese restaurant and a hair salon.

#### **3.2 Project Description**

The project’s objective includes evaluating the effectiveness of various cleaning procedures that may have been used in the residential spaces. The study will include 12 residential spaces and 3 commercial spaces. The two restaurants and hair salon are not a part of the study, but will be cleaned at the completion of the study. Eight cleaning techniques will be evaluated:

1. Vacuuming with non-HEPA vacuums
2. Vacuuming with non-HEPA vacuums with Negative Air Machines (NAM)
3. Vacuuming with non-commercial HEPA vacuums
4. Vacuuming with non-commercial HEPA vacuums with NAM
5. Vacuuming with commercial HEPA vacuums
6. Vacuuming with commercial HEPA vacuums with NAM
7. Vacuuming heavy dust laden areas with commercial HEPA vacuums and 2 NAMs
8. Vacuuming heavy dust laden areas with commercial HEPA vacuums and 2 NAMs with vertical surface wet wiping and carpet shampooing.

Each cleaning technique will be evaluated on two rental units. Activities will include the following:

- Mobilization to site



- Establishing Support Area and Facilities
- Assist with photo documentation and resident visits
- Isolate study areas from common areas (plastic sheeting and adhesive tape)
- Clean common areas (HEPA vacuum and wet wipe horizontal surfaces)  
Hallways,  
Building entry ways,  
Laundry rooms,  
Stairs and wells,  
Elevator well, roof mechanical room, interior and lobby,  
Trash compactor and utility rooms (5), and  
Basement
- Clean previously cleaned areas using the techniques to be evaluated
- Clean areas not previously cleaned using the techniques to be evaluated
- Clean non-study areas
- Dispose of wastes
- Decontaminate cleaning equipment
- Demobilization

#### 4.0 HAZARD ANALYSIS

The evaluation of hazards is based upon the knowledge of project background information presented in Section 3, and anticipated risks posed by the specific tasks/operations to be performed. Section 4 presents a general description of project hazards. Section 4.2 describes the specific hazards associated with each task/activity, and identifies the hazard control measures to be implemented during completion of these tasks.

#### 4.1 General Hazard Analysis

Potential/ Anticipated Hazards

CHEMICAL	YES	SLIPS, TRIPS, & FALLS SAME LEVEL	YES
ASBESTOS	YES	SLIPS, TRIPS, & FALLS DIFFERENT LEVEL	YES
FIRE/ EXPLOSION	NO	HEAVY EQUIPMENT/ VEHICULAR TRAFFIC	YES
HEAT STRESS	YES	OVERHEAD HAZARDS	YES
MACHINERY/ MECHANICAL EQUIPMENT	YES	ELECTRICAL/ UTILITY HAZARDS	YES
NOISE	YES	CONFINED SPACE	NO

#### 4.1.1 Physical Hazards

Noise – vacuums produce noise exposures in excess of the permissible exposure limit (90dBA). Operators of these pieces of equipment must wear hearing protection (plugs). Others working in the same room/ area must wear hearing protection as well.

Ambient temperatures - capable of producing either heat are expected to impact the projec. The WRS SOP for Heat Stress Management is included as an Appendix B.

Motor vehicles – obey local traffic laws, use qualified drivers in insured vehicles. Seatbelt use is mandatory.

Flame, Heat or Spark Producing Operations - The use of flame, heat or spark producing equipment (e.g., cutting or welding torches and abrasive saws) is prohibited.

High or Elevated Work - All work near an unprotected side or edge (no handrail) which would allow a fall to a lower level of six feet or more will be performed using fall protection (e.g., body harness and lifeline). Fall protection equipment will provide continuous protection. Workers in aerial lift baskets will utilize full body harnesses with lanyards attached to the man basket. See the WRS Standard Operating Procedure for Fall Protection (Appendix D)

Electrical Safety - Ground fault protection devices (GFCI) will be provided for all electric power tools and extension cords. Vacuums directly (no extension cord) plugged into the building's outlets are exempt from this requirement when the outlet has been tested and verified to provide adequate grounding. Voltage detectors may be used to facilitate electrical safety. The WRS Lockout/ Tagout SOP (Appendix C) will be applied specifically to cleaning the elevator, and generally to activities specified in the SOP

Eye Protection - Eye protection is mandatory in all areas of the project site at all times. Eye protection will conform to ANSI Standard Z87.

Head Protection – Hardhats will be worn when overhead hazards exist and when the hazard of an employee bumping his head on an overhead object exists.

Floor Holes – cover floor holes in the building.

#### 4.1.2 Chemical Hazards

SUBSTANCE	EXPOSURE LIMIT (PEL)	IDLH LEVEL	HEALTH EFFECTS	ROUTE OF ENTRY	FIRST AID By Route of Exposure
Polycyclic Aromatic Hydrocarbons (PAHs)	0.2 mg/m3	80 mg/m3	Dermatitis, bronchitis, potential occupational carcinogen	Inhalation, Contact	Eye: irrigate immediately, Skin: soap wash promptly
Lead	0.050 mg/m3	100 mg/m3	Weak, insomnia, gingival lead line, abdominal pain, irritated eyes	Inhalation Ingestion	Eye: irrigate immediately, Skin: soap wash promptly
Crystalline silica	Respirable 10 mg/m3 /% SiO2 +2	50 mg/m3	Cough, pain with breathing, wheezing, decreased pulmonary function, silicosis, cancer of lung	Inhalation	Eye: irrigate immed. Breath: fresh air
Asbestos	0.1 fiber/ cc	NA	Asbestosis, pain with breathing, restricted pulmonary function, finger clubbing, lung cancer	Inhalation Ingestion Contact	Eye: irrigate immed. Breath: fresh air

SUBSTANCE	EXPOSURE LIMIT (PEL)	IDLH LEVEL	HEALTH EFFECTS	ROUTE OF ENTRY	FIRST AID By Route of Exposure
Dioxin (1,1,2,2-Tetrachloro-debenzo-p-dioxin)	None	None	Eye irritation, allergic dermatitis, chloracne, digestive disturbances, possible reproductive effects, in animals produces liver/ kidney damage, cancer	Inhalation Ingestion Contact	Eye: irrigate immed. Skin wash with soap/ water Breath: fresh air Swallow: med attention
Man Made Vitreous Fibers (aka fiberglass and glass wool)	15 mg/m3 (total) 5 mg/m3 (respirable)	None	Irritation of eyes skin nose, throat, pain with breathing	Inhalation Contact	Eye: irrigate immed. Breath: fresh air
Gypsum (calcium (II) sulfate dihydrate)	15 mg/m3 (total) 5 mg/m3 (respirable)	None	Irritation of eyes, skin, mucous membranes, upper respiratory system, coughing, sneezing, runny nose	Inhalation Contact	Eye: irrigate immed. Breath fresh air

Concentrations of these materials in bulk samples collected to date include:

- Asbestos <1% (reported as chrysotile)
- Lead up to 300 ppm
- MMVF up to 40%
- Dioxin up to 0.088 ppb
- PAHs up to 340 ppm
- Crystalline silica (quartz) up to 10%
- Gypsum up to 14%

## **5.0 PERSONNEL TRAINING REQUIREMENTS**

### **5.1 General**

All project personnel are trained in accordance with OSHA's 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response Standard. At a minimum, all personnel are required to be trained to recognize the hazards on-project, the provisions of this HASP, and the personnel responsible for safety on the project.

### **5.2 Pre-Assignment and Annual Refresher Training**

Non required other than and orientation to the site including a walkthrough. All employees should have their current 8-hr annual refresher training and be medically qualified to wear a respirator.

### **5.3 Project Supervisors Training**

Consistent with OSHA 29 CFR 1910.120 paragraph (e)(4), individuals designated as Project Supervisors receive an additional 8 hours of training in addition to the 40 hr certification.

### **5.4 Health and Safety Plan Review**

Prior to working on the project, each person will review the HASP and will have the opportunity to ask questions of the Project Health and Safety Officer about the plan's contents. After reviewing the HASP, WRS employees and subcontractor employees will sign the HASP Review Sign-Off (Safety Briefing form) located in *Appendix A*.

### **5.5 Daily Safety Meetings**

Project safety meetings will be conducted daily. The meeting will cover:

- The work to be completed.
- Hazards associated with the work. and,
- Hazard control measures to be implemented.

WRS subcontractor employees and their supervisor(s) are required to attend.

## 5.6 Asbestos Training

The clean up of the dust in this building is an unclassified task because the material does not contain enough asbestos (<1%) to be considered Asbestos Containing Material (ACM). Therefore the training requirements at 29 CFR 1926.1101(k)(9)(viii) apply. There is no minimum or maximum time allotted for completion of this training only a list of subjects to be covered. Employees performing dust removal activities will have training that meets or exceeds these requirements.

## 5.7 Lead Training

Lead is present in the dusts to be removed. Lead training is required at 29 CFR 1926.62 (l) when employee exposures exceed the Action Limit of 30 ug/m<sup>3</sup>. Because the dust removal methods are designed to minimize the aerosolization of the dust, and the low concentrations (< 300 ppm), it is not anticipated that Action Limit will be reached and lead training will therefore not be necessary. An exposure assessment will be used to verify this assumption.

## 6.0 PERSONAL PROTECTIVE EQUIPMENT

This section describes the specific levels of protection required for each task to be conducted at the project. The general requirements of the EPA designated Levels of Protection (A-D) are described in the WRS Health and Safety Program Manual. The level of protection to be worn by field personnel will be monitored by the IHSO.

### 6.1 Specific Levels of Protection Planned for the Project

PPE assignments are task specific. Table 6.1 on the following page lists task specific PPE levels. These levels are disqualified for use if air surveillance indicates that the upper action limit for the level of protection being used is exceeded.

TABLE 6.1: LEVELS OF PROTECTION		
Location	Job Function/Task	PPE
Exclusion Zone	• Surveying and prep of previously cleaned areas	C1/2
	• Surveying and prep of areas not previously cleaned	CPAPR
	• Vacuuming with Non-HEPA filtered equipment	CPAPR
	• Vacuuming with HEPA filtered equipment in previously cleaned areas	C1/2
	• Wet wiping following non-HEPA vacuuming	C1/2
	• Wet wiping following HEPA vacuuming	D+
	• Cleaning equipment using air and vacuum	CPAPR
	• Removing/ Changing vacuum bags/ filters	CPAPR
Support Zone	Project Management Activities Materials Storage	D

## 6.2 Ensemble Components

### Level D

This is the basic work uniform and shall consist of the following items:

- Safety glasses
- Steel-toed boots
- Hearing protection (as applicable)
- Leather gloves

### Level D+

- Safety glasses
- Disposable coverall (Tyvek or Kleengaurd)
- Disposable head covering
- Disposable undergarments
- Disposable gloves
- Disposable boot covers or reusable/ cleanable boots (e.g., PVC, latex)
- Steel toe boots
- Hearing protection
- Skin Barrier Cream for preventing fiberglass dermatitis (North Brand Model 222 available from Lab Safety)

### Level C

- Air Purifying Respirator (1/2 mask or full face PAPR)
- P100 Cartridges
- Disposable coverall (Tyvek or Kleengaurd)
- Disposable head covering
- Disposable undergarments
- Disposable gloves
- Disposable boot covers or reusable/ cleanable boots (e.g., PVC, latex)
- Steel toe boots
- Hearing protection
- Skin Barrier Cream for preventing fiberglass dermatitis (North Brand Model 222 available from Lab Safety)

## 6.3 Application

Table 6.1 details the anticipated levels of protection for different tasks. However, project developments may prompt changes in the levels of PPE. Proper notification of the IHSO, HSA, and WRS Project manager is required to ensure continued safe operations.

**NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE KNOWLEDGE AND APPROVAL OF THE NORTHEAST SAFETY AND HEALTH ADMINISTRATOR, WRS PROJECT HEALTH AND SAFETY OFFICER, AND THE WRS PROJECT MANAGER.**

#### **6.4 Inspection**

Before protective equipment is worn within the project area, its user will properly inspect it.

#### **6.5 Respirator Cartridge Change-out Schedule**

PAPR cartridges will be changed out when flow rate indicator (a.k.a. rotameter) measures unacceptably low flows. APR cartridges will be changed out when breathing becomes difficult or daily whichever comes first.

### **7.0 MEDICAL SURVILLANCE REQUIREMENTS**

#### **7.1 General**

WRS utilizes a Medical Monitoring Program designed to determine each employee's health status and fitness (including the ability to utilize respiratory protection) for working at hazardous waste sites. All WRS personnel involved in hazardous waste project activities are required to undergo baseline, annual, and project specific examinations. WRS utilizes the services of physicians experienced in occupational medicine and the effects of toxic industrial substances. Medical surveillance records for WRS employees are retained for the length of employment plus 30 years.

#### **7.2 Site Specific Medical Monitoring**

No site specific medical monitoring is anticipated beyond that required under the Heat Stress Management SOP.

#### **7.3 Substance Abuse Prevention**

It is the policy of WRS to provide quality products and services to its customers and to maintain a safe and healthy workplace by assuring a work environment free of alcohol and other drugs. The unlawful manufacture, distribution, dispensation, possession, use or presence in one's system of a controlled substance is prohibited in the workplace. Any employee who is in violation of this policy will be subject to disciplinary action up to and including discharge. Help is available to employees who have substance abuse problems through the Employee Assistance Program.

Federal law also requires that an employee of WRS notify WRS in writing of a conviction under a criminal drug statute for a violation occurring during the performance of work under a covered federal procurement. This project is covered. Such notifications must be made through the WRS Health and Safety Manager.

## **7.4 Asbestos**

The medical surveillance program outlined under 7.1 of this Plan includes the medical surveillance components required by the Asbestos Standard at 29 CFR 1926.1101(m).

## **7.5 Lead**

Blood lead and ZPP monitoring are required by 29 CFR 1926.62(j) when airborne exposures exceed the Action Level of 30 ug/m<sup>3</sup>. Because the dust removal methods are designed to minimize the aerosolization of the dust, and the low concentrations (< 300 ppm), it is not anticipated that Action Limit will be reached and blood lead/ ZPP monitoring will therefore not be necessary. An exposure assessment will be used to verify this assumption.

## **8.0 AIR SURVEILLANCE**

This section specifies the surveillance activities that will take place during the project. Surveillance activities will achieve the following objectives:

- Characterize breathing zone (BZ) concentrations of site contaminants for comparison with published exposure limits;
- Determining the appropriateness of respiratory protective equipment; and,
- Monitoring the performance of emission control activities.

## **8.1 Monitoring**

The usefulness of real time monitoring of respirable dust in this work environment is unknown to WRS. Collecting this data alongside air sampling activities may “calibrate” future real-time respirable dust monitoring and the establishment of Action Limits. WRS will perform real-time respirable dust monitoring to instruct the crew in relative dust levels. There will be no respirable dust Action Limits until or unless air-sampling data is available for comparison with real-time data.

## **8.2 Action Limits**

None initially.

## **8.3 Air Sampling**

Personal air sampling for lead, asbestos, and silica will be performed. Samples will be collected from the breathing zones of employees using the following NIOSH Methods. Analysis of samples will be made using NIOSH analytical method as well to facilitate comparisons with exposure limits.



Method	Flow Rate	Sample Train Media
7300 Lead	2 liters per minute minimum sample volume to achieve detection limits 50 liters	37 mm cellulose ester membrane (0.8 micron) Closed Face
7400 Fibers (Asbestos and Man Made Vitreous Fibers MMVF)	2 liters per minute** minimum sample volume to achieve detection limits – 400 liters	25 mm cellulose ester membrane (pore size 0.45 – 1.2 microns) with conductive cowl. Open face
7500 Respirable Silica/ Calcite/ Gypsum*	1.7 liters per minute** minimum sample volume to achieve detection limits – 400 liters	37 mm PVC membrane (pore size 5 micron) with 10 mm nylon cyclone

\* This methods requires that a bulk respirable or settled dust sample be submitted with personal breathing zone sample to identify interferences with detection method.

\*\*These methods are sensitive to filter over loading. Length of sampling period should not exceed 4 hours. Use multiple sample periods to represent entire shift exposure.

Samples will be collected on individuals performing tasks representative of exposure conditions. Specifically the following tasks will be characterized:

- Common area cleaning;
- Non-HEPA vacuuming; and,
- Cleaning of areas not previously cleaned.

Sample pumps will be pre- and post sample period calibrated using a sample train in-line between the pump and calibration unit to simulate pressure drop posed by the sample train. Calibrations will be made with a primary calibration device (e.g., film flow calibrator or near frictionless piston).

Sample results will be communicated by the SHSO to employees represented by the sample data within five days of receipt on the WRS Air Sampling Data Acknowledgement Form. This data is forwarded to the WRS H&S Manager for inclusion in the employee's medical file.

## **9.0 SITE CONTROL MEASURES**

### **9.1 Control Zones**

Control boundaries will be established at the site. The exclusion zone, contamination reduction zone (decontamination zone) and support zone will be designated. A decontamination corridor will separate the Support areas of the project site from exclusion zones. The corridor should be split down the middle with a control line. One side of the corridor is for clean entry into exclusion zones and the other side is for decontamination of personnel and equipment. It may be necessary to protect the support zone from fugitive dust by placing it under positive pressure with the exhaust of a Negative air machine.

The Response Manager has been designated to coordinate access control on the work site. No unauthorized person shall be allowed beyond the contamination control line. During all activities in the exclusion zone, the implementation of a buddy system is mandatory.

Standing orders for the exclusion zone and contamination reduction zone are presented on the following page.

### **9.2 Site Communications Plan**

Hand signals, radios, and mobile telephones are the modes of communication to be used at the site. The Response Manager will review hand signals with all site personnel prior to the start of the project and periodically at daily safety meetings. Standard hand signals include:

<b>ACTION</b>	<b>MEANING</b>
Hands around throat	- out of air/can't breathe
Thumbs up	- OK/yes
Thumbs down	- negative, no
Hands on top of head	- need assistance
Grip partner's wrist/waist	- leave area immediately

No one will be permitted to break visual contact while in the exclusion zone or contamination reduction zone. The buddy system will be strictly adhered to. When working in the exclusion zone, personnel will not be allowed to work alone. The buddy system will be in place to provide aid in case of an emergency.

A telephone will be available in the support zone. Emergency assistance telephone numbers will be posted by this telephone. The Project Manager is responsible for the management of communications during normal and emergency operations.

### **9.3 Sanitation Facilities**

Sanitation facilities will be located within the support zone. They will include hand and face washing facilities and toilets.

<b><i>Standing orders for the exclusion zone and contamination reduction zone are as follows:</i></b>	
•	No smoking, eating, or drinking in these zones. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of any material is prohibited in any area designated as a contamination reduction zone or exclusion zone.
•	No horse play.
•	No matches or lighters in these zones.
•	Check-in on entrance to the contamination reduction zone. Check-out on exit from this zone. Entrance and exit locations shall be designated and emergency escape routes delineated. Warning signals for site evacuation have been established.
•	Implement the communications system. Communications using radios, hand signals, signs, or other means shall be maintained between work crew members at all times. Emergency communication shall be prearranged in case of radio failure, necessity for evacuation off site, or other reasons.
•	Maintain visual contact between exclusion zone entrants.
•	Wear the appropriate level of protection as defined in the site specific Health and Safety Plan.
•	Work will only be performed during daylight hours unless adequate lighting is available.
•	Contact with known or suspected contaminated surfaces should be avoided. Whenever possible, there will be no walking through puddles or discolored surfaces; kneeling on ground; or leaning, sitting or placing equipment on drums, containers, or the ground.
•	Prescribed drugs should not be taken by personnel where the potential for absorption, inhalation, or ingestion of toxic substances exists, unless specifically approved by a qualified physician.
•	All respirator wearers must be certified as being capable of wearing respiratory protection (physician's approval, fit tested) while performing their assigned tasks. All respirator wearers must have been fit tested, within the past 12 months, with the make and size respirator to be worn. No facial hair is allowed that would interfere with respirator fit.
•	Work areas for all operational activities shall be clearly established and clearly delineated in the site specific Health and Safety Plan.
•	Work areas and decontamination procedures shall be established based on expected site conditions and clearly delineated in the site specific Health and Safety Plan.

Personnel and equipment in the exclusion zone(s) will be minimized, consistent with effective site operations.

## **10.0 DECONTAMINATION PLAN**

Decontamination of equipment and personnel will be performed to limit the potential migration of contaminants outside the exclusion zone. All equipment and personnel will be decontaminated prior to leaving the exclusion zone.

### **10.1 Levels Of Decontamination Protection Required For Assisting Personnel**

The level of protection required for personnel assisting with decontamination is one level below that of the person being decontaminated. The Industrial Hygiene and Safety Officer is responsible for monitoring decontamination procedures and determining their effectiveness.

### **10.2 Equipment Decontamination**

All vacuums and Negative Air Machines will have filters and pre-filters removed and disposed of before demobilization. They will also be wet wiped. The Response Manager and SHSO are responsible for ensuring the cleanliness of equipment prior to leaving the site. Any other equipment not disposed of after the job will be wet wiped.

### **10.3 Personnel Decontamination**

#### **10.3.1 Procedure**

All site personnel should minimize contact with contaminants in order to reduce the need for extensive decontamination. Personnel decontamination will be conducted in the decontamination zone. Gross decontamination for PPE Levels C and D+ will include:

1. Vacuum coverall/ boots with HEPA vacuum
2. Remove coveralls and dispose
3. Remove boot covers and dispose (alternate: rinse boots/ remove and hang for drying)
4. Remove gloves and dispose
5. Remove respirator
6. Wash/rinse respirator (inside and out) and hang for drying
7. Rinse hard hat (inside and out)

Personal hygiene following decontamination will take place in the support zone.

#### **10.3.2 Equipment**

Personal decontamination equipment will consist of trashcans with liners (for disposable PPE), three-gallon containers (respirator wash, sanitize and rinse), water supply, and detergent.

### **10.4 Disposition of Decontamination Wastes**

All equipment used for decontamination shall be decontaminated or disposed of properly. Aqueous liquids will be disposed according to the Site Work Plan. All disposable PPE will be containerized and properly disposed.

## **11.0 EMERGENCY RESPONSE PLAN**

This Emergency Response Plan has been prepared to define the responsibilities, resources and actions necessary to respond to uncontrolled releases of contaminated materials and injury to personnel.

### **11.1 Pre-Emergency Planning**

This Emergency Response Plan will be reviewed and revised on a regular basis (if necessary) by the IHSO. This will ensure that the plan is adequate and consistent with prevailing project conditions.

Local emergency medical, fire, and police resources will be identified.

### **11.2 Personnel Roles and Lines of Authority**

The Project manager has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measures to ensure the safety of project personnel and the public.

The individual subcontractor organizations are responsible for assisting the Project manager in his/her mission within the parameters of their scope of work.

### **11.3 Emergency Recognition/Prevention**

Section 4.0 identifies the chemical and physical hazards on project. Additional hazards that may result from project activities are listed in Table 11.1. This table also lists prevention and control techniques/mechanisms. Personnel will be familiar with techniques of hazard recognition from pre-assignment training and project specific briefings. The IHSO is responsible for ensuring that prevention devices or equipment are available to personnel.

TABLE 11.1: EMERGENCY RECOGNITION/CONTROL MEASURES		
Potential Hazard	Prevention/Control	Location of Response Equipment
Fire	<ul style="list-style-type: none"> <li>• Fire Extinguisher (15 lb. dry chemical)</li> <li>• Ignition source control</li> <li>• Hot Work Prohibited</li> </ul>	<ul style="list-style-type: none"> <li>• One per floor</li> </ul>
Eyewash Facility	<ul style="list-style-type: none"> <li>• 15 Minute Drench</li> </ul>	<ul style="list-style-type: none"> <li>• At Building Entrance</li> </ul>
Delayed Building Exit	<ul style="list-style-type: none"> <li>• Mark routes of exit</li> <li>• Do not block stairs/ exits</li> </ul>	<ul style="list-style-type: none"> <li>• All stairways/ exits</li> </ul>

#### 11.4 Emergency Equipment/Facilities

- First aid kit
- Fire extinguishers
- Telephone

The following safety equipment and materials will be maintained on project.

##### Safety Equipment

Number	Item
1	Industrial First Aid Kit
1	Fire Extinguisher per floor
1	Eyewash Station

In the event of an injury requiring more than minor first aid, or any employee reporting any sign or symptom of exposure to hazardous substances, immediately take the victim to a local emergency medical provider. In the event of life-threatening or traumatic injury, implement appropriate first aid and immediately call for emergency medical assistance. If the patient's condition is serious first aid should be administered while awaiting an ambulance or paramedics.

When an individual(s) is being transported to a clinic or hospital for treatment, the Project manager, or IHSO should ensure that information on the chemical(s) the individual(s) have been exposed to at the project is taken. This information, which is included in Section 4.0, could also be given to the hospital during project set-up activities. Any vehicle used to transport contaminated personnel will be treated and cleaned as necessary.

#### 11.5 Fire or Explosion

In the event of a fire or explosion, the local Fire Department should be summoned immediately. Upon their arrival, the Project manager or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on project.

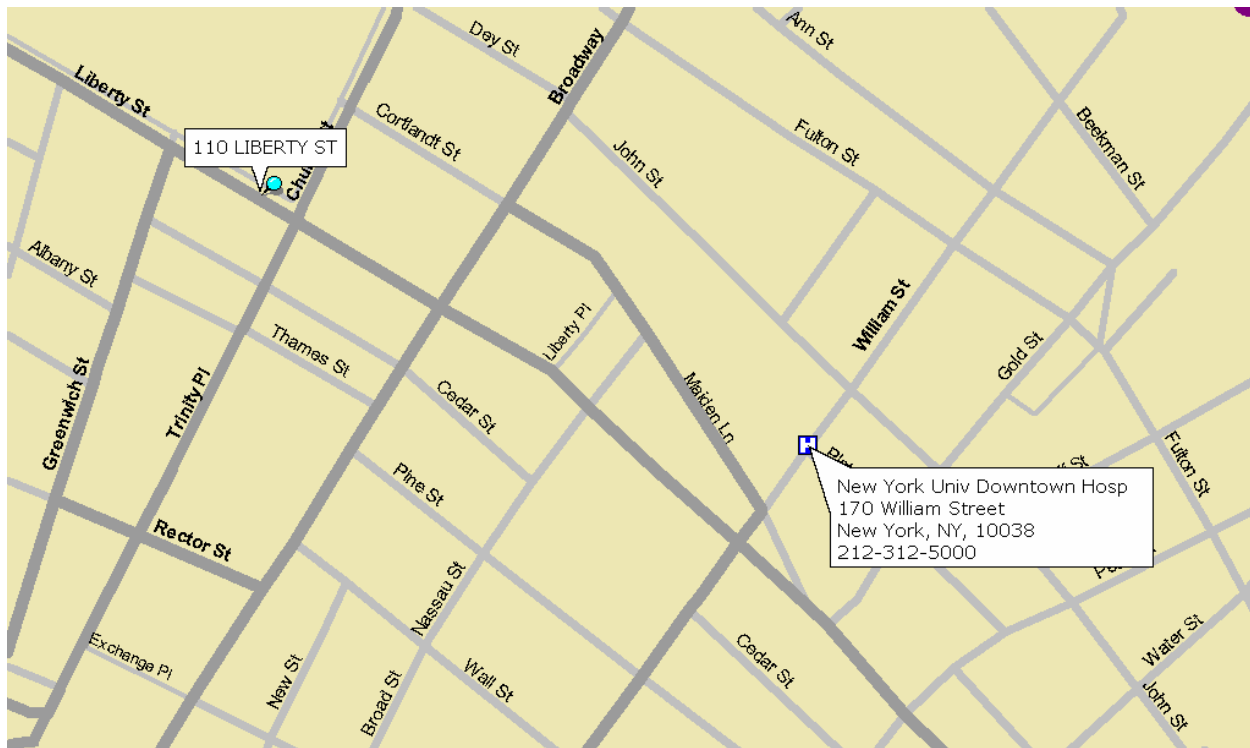
The IHSO shall act as the designated project emergency coordinator and shall have final authority for initial response to on-project emergency situations. Upon arrival of the appropriate emergency response personnel, the IHSO shall defer all authority but shall remain on the scene to provide assistance, if necessary. At the earliest opportunity, the IHSO shall contact the Project manager.

#### 11.6 Spill or Leaks

In the event of a spill or a leak, project personnel will:

- Inform the Project manager immediately

If a leak occurs containment procedures will begin if possible. Simultaneously, the source of the spill will be stopped if it is still releasing material. Air monitoring should be conducted downwind. The WRS Representative will be responsible for any reporting procedures that are required as a result of the spill.



**Figure 11-1  
Route to Hospital**

**EMERGENCY TELEPHONE NUMBERS AND HOSPITAL ROUTE**

<b>EMERGENCY ASSISTANCE TELEPHONE LIST</b>	
<b>EMERGENCY ASSISTANCE ORGANIZATION</b>	<b>TELEPHONE NUMBER</b>
<b>New York University Downtown Hospital 170 William Street New York, NY 10038</b>	<b><u>212-312-5000</u></b>
<b>AMBULANCE/RESCUE SQUAD</b>	<b>911</b>
<b>FIRE</b>	<b>911</b>
<b>LOCAL POLICE</b>	<b>911</b>
<b>WRS BRISTOL OFFICE</b>	<b>267-540-0048</b>
<b>WRS H&amp;S Manager</b>	<b>770-469-6522</b>
<b>CHEMTREC (24 HOURS)</b>	<b>(800) 424-9300</b>
<b>U. S. COAST GUARD NATIONAL RESPONSE CENTER (NRC)</b>	<b>(800) 424-8802</b>
<b>EPA OSC Communications</b>	<b>732-689-0019</b>

**APPENDIX A**  
**HEALTH AND SAFETY FORMS**



1. Accident/Incident Report
2. Daily Safety Meeting Form
3. Training Attendance Record
4. Qualitative Respirator Fit Test and Inspection Form
5. Daily Safety Report
6. SSHP Change Authorization
7. SSHP Sign-Off
8. Air Monitoring Log
9. Quantitative Respirator Fit Test Form

# WRS INFRASTRUCTURE & ENVIRONMENT, INC.

## INJURY/ILLNESS/INCIDENT INVESTIGATION AND REPORT (OSHA 301 Form Equivalent)

Supervisor Complete Both Pages/Forward to Branch and WRS H&S Manager within 48 hrs./Supervisor's Manager Review for Completeness

### Personal & Background Information

<b>1. Case Number</b>		<b>2. Soc. Sec. No.</b>		<b>3. Name</b> (Last name, first initial)			<b>5. Date of Birth</b>				
<b>6. Gender</b> <input type="checkbox"/> M <input type="checkbox"/> F		<b>7. Date of Hire</b>		<b>8. Job or Site Name</b>			<b>9. Job Number</b>				
<b>11. Time of Accident</b>		<b>12. Time Employee Began Work</b>		<b>13. Date of Accident</b>		<b>14. Date Reported</b>		<b>15. Number of Others Involved in Accident</b>			
<b>16. Occupation at Accident Time</b>				<b>17. Regular Occupation</b>			<b>18. Number of Others Injured in Accident</b>				
<b>19. Nature of Injuries</b> (Bruise, Strain, etc.)						<b>20. Injured Body Part</b> (left index finger)					
<b>21. Names of Others Involved in Accident</b>						<b>22. Names of Others Injured in Accident</b>					
<b>23. Chemicals Involved in Accident</b>				<b>24. Exact Location of Accident</b> (Sketch on Back)			<b>25. On WRS Premises?</b> <input type="checkbox"/> Yes <input type="checkbox"/> No				
<b>26. Activity Injured was doing at time of accident or illness</b> (operating backhoe, unloading drums, etc.) --Try to Identify job in three words -- Use no more than 30 spaces											
<b>27. What Occurred</b> (Use single line descriptive sentences to tell the story of what occurred)											
<b>28. Check Type of Accident</b> (Check one) <input type="checkbox"/> a. Struck by <input type="checkbox"/> c. Contacted by <input type="checkbox"/> e. Trapped in <input type="checkbox"/> g. Caught between <input type="checkbox"/> i. Different level fall <input type="checkbox"/> k. Exposure <input type="checkbox"/> b. Struck against <input type="checkbox"/> d. Contact with <input type="checkbox"/> f. Caught on <input type="checkbox"/> h. Same level fall <input type="checkbox"/> j. Strain/overexertion <input type="checkbox"/> l. Other											
<b>29. Accident Agent</b> (Limit to 21 spaces)(i.e., equipment, machine, hand tool)						<b>30. Contact Agent</b> (Limit to 22 spaces)(i.e., machine part or material contacting)					
<b>31. UNSAFE ACTIONS - What did employee do or fail to do that caused or contributed to accident?</b> (Check no more than 2, give details on reverse) <input type="checkbox"/> a. Operating without authority <input type="checkbox"/> i. Failure to make inoperative <input type="checkbox"/> b. Failure to make secure <input type="checkbox"/> j. Riding hazardous equipment <input type="checkbox"/> c. Operating unsafe speed <input type="checkbox"/> k. Took unsafe position <input type="checkbox"/> d. Failure to warn/signal <input type="checkbox"/> l. Horseplay, distractive <input type="checkbox"/> e. Nullified safety device <input type="checkbox"/> m. No protective equip. worn <input type="checkbox"/> f. Used defective equipment <input type="checkbox"/> n. Unsafe job procedure <input type="checkbox"/> g. Used equipment unsafely <input type="checkbox"/> o. No unsafe action <input type="checkbox"/> h. Used wrong tool <input type="checkbox"/> p. Other						<b>32. UNSAFE CONDITIONS - What condition of tools, equipment or job site caused or contributed to accident?</b> (Check no more than 2, give details on reverse) <input type="checkbox"/> a. Inadequate guard/Safety device <input type="checkbox"/> h. Close clearance/congestion <input type="checkbox"/> b. Hazardous personal attire <input type="checkbox"/> i. Hazardous arrange/storage <input type="checkbox"/> c. Inadequate warning system <input type="checkbox"/> j. Defective tools/equipment <input type="checkbox"/> d. Fire or Explosion hazard <input type="checkbox"/> k. Atmospheric condition <input type="checkbox"/> e. Unsecured against movement <input type="checkbox"/> l. Illumination/noise <input type="checkbox"/> f. Poor housekeeping <input type="checkbox"/> m. Other unsafe condition <input type="checkbox"/> g. Protruding object <input type="checkbox"/> n. No unsafe condition					
<b>33. What caused or influenced unsafe actions you identified above?</b> (Answer only if item 32 applies. Check no more than 2) <input type="checkbox"/> a. Unaware of job hazards <input type="checkbox"/> h. Influence of emotions <input type="checkbox"/> b. Inattention to hazard <input type="checkbox"/> i. Influence of fatigue <input type="checkbox"/> c. Unaware of safe method <input type="checkbox"/> j. Influence of intoxicant/drugs <input type="checkbox"/> d. Low level job skill <input type="checkbox"/> k. Defective vision <input type="checkbox"/> e. Tried to gain or save time <input type="checkbox"/> l. Influence of illness <input type="checkbox"/> f. Tried to avoid extra effort <input type="checkbox"/> m. Other personal factors <input type="checkbox"/> g. Tried to avoid discomfort <input type="checkbox"/> n. Unknown personal factors						<b>34. What caused or influenced unsafe condition you identified above?</b> (Answer only if item 33 applies. Check no more than 2) <input type="checkbox"/> a. Caused by employee <input type="checkbox"/> h. Preventive maintenance failure <input type="checkbox"/> b. Defective from normal use <input type="checkbox"/> i. Defective tools/equipment <input type="checkbox"/> c. Defective via abuse/misuse <input type="checkbox"/> j. Exposure to corrosion <input type="checkbox"/> d. Safety inspection failure <input type="checkbox"/> k. Extreme temperature <input type="checkbox"/> e. Housekeeping/cleaning failure <input type="checkbox"/> l. Caused by other employees <input type="checkbox"/> f. Faulty design/construction <input type="checkbox"/> m. Other source cause <input type="checkbox"/> g. Inadequate illumination <input type="checkbox"/> n. Unknown source cause					
<b>35. What action has been taken (Mark X box) or is planned (Mark P box) to prevent recurrence:</b> (Mark no more than 5) <table border="0"><tr><td><b>X P</b> <input type="checkbox"/> a. Reinstruction of employee <input type="checkbox"/> b. Reprimand/warning of employees involved <input type="checkbox"/> c. Penalty discipline of employee involved <input type="checkbox"/> d. Preventive instruction of others who do job <input type="checkbox"/> e. Job reassignment of employee <input type="checkbox"/> f. Improved inspection procedure <input type="checkbox"/> g. Improved cleanup procedure</td><td><b>X P</b> <input type="checkbox"/> h. Action to improve enforcement <input type="checkbox"/> i. Order JSA done on job <input type="checkbox"/> j. Order JSA revision <input type="checkbox"/> k. Install safety guard against <input type="checkbox"/> l. Require protective equipment <input type="checkbox"/> m. repair/replace equipment <input type="checkbox"/> n. Improve storage/arrangement</td><td><b>X P</b> <input type="checkbox"/> o. Improve design/construction <input type="checkbox"/> p. Eliminate congestion <input type="checkbox"/> q. Use safer Materials/supplies <input type="checkbox"/> r. Improve illumination/ventilation <input type="checkbox"/> s. Mandatory pre-job instructions <input type="checkbox"/> t. Correction other than above <input type="checkbox"/> u. No action required</td></tr></table>									<b>X P</b> <input type="checkbox"/> a. Reinstruction of employee <input type="checkbox"/> b. Reprimand/warning of employees involved <input type="checkbox"/> c. Penalty discipline of employee involved <input type="checkbox"/> d. Preventive instruction of others who do job <input type="checkbox"/> e. Job reassignment of employee <input type="checkbox"/> f. Improved inspection procedure <input type="checkbox"/> g. Improved cleanup procedure	<b>X P</b> <input type="checkbox"/> h. Action to improve enforcement <input type="checkbox"/> i. Order JSA done on job <input type="checkbox"/> j. Order JSA revision <input type="checkbox"/> k. Install safety guard against <input type="checkbox"/> l. Require protective equipment <input type="checkbox"/> m. repair/replace equipment <input type="checkbox"/> n. Improve storage/arrangement	<b>X P</b> <input type="checkbox"/> o. Improve design/construction <input type="checkbox"/> p. Eliminate congestion <input type="checkbox"/> q. Use safer Materials/supplies <input type="checkbox"/> r. Improve illumination/ventilation <input type="checkbox"/> s. Mandatory pre-job instructions <input type="checkbox"/> t. Correction other than above <input type="checkbox"/> u. No action required
<b>X P</b> <input type="checkbox"/> a. Reinstruction of employee <input type="checkbox"/> b. Reprimand/warning of employees involved <input type="checkbox"/> c. Penalty discipline of employee involved <input type="checkbox"/> d. Preventive instruction of others who do job <input type="checkbox"/> e. Job reassignment of employee <input type="checkbox"/> f. Improved inspection procedure <input type="checkbox"/> g. Improved cleanup procedure	<b>X P</b> <input type="checkbox"/> h. Action to improve enforcement <input type="checkbox"/> i. Order JSA done on job <input type="checkbox"/> j. Order JSA revision <input type="checkbox"/> k. Install safety guard against <input type="checkbox"/> l. Require protective equipment <input type="checkbox"/> m. repair/replace equipment <input type="checkbox"/> n. Improve storage/arrangement	<b>X P</b> <input type="checkbox"/> o. Improve design/construction <input type="checkbox"/> p. Eliminate congestion <input type="checkbox"/> q. Use safer Materials/supplies <input type="checkbox"/> r. Improve illumination/ventilation <input type="checkbox"/> s. Mandatory pre-job instructions <input type="checkbox"/> t. Correction other than above <input type="checkbox"/> u. No action required									
<b>36. Immediate Supervisor</b> (Last name first, first initial)						<b>37. Employee's Signature</b>					
<b>38. Investigated by</b> (Names and positions)				<b>Date</b>		<b>39. Reviewed and approved by</b> (Name and position)			<b>Date</b>		

### Part 1. Accident Description and Direct Cause Analysis

# WRS INFRASTRUCTURE & ENVIRONMENT, INC.

## INJURY/ILLNESS/INCIDENT INVESTIGATION AND REPORT (OSHA 301 Form Equivalent)

Supervisor Complete Both Pages/Forward to Branch and WRS H&S Manager within 48 hrs./Supervisor's Manager Review for Completeness

### 1. What Occurred

Describe in sequence (1) relevant background information if any, (2) employee's location and position relative to immediate surroundings, (3) how employee was doing job, (4) what occurred that precipitated the accident, (5) the type of accident and contact agent.

**2. Contributing "Unsafe" Action** What did the injured (or other person) do or fail to do that contributed directly to accident? Be specific.  
(Ex., Failed to use protective equipment, Failed to lock out machine)  
Don't report "Carelessness."

**3. Contributing "Unsafe" Condition** What defective or otherwise unsafe conditions of tools, equipment, machines, structures or work equipment contributed directly to accident?  
(Ex., Oil on floor, Broken or missing machine guard, Poor housekeeping)

### Part 2. Corrective Action Must Be Taken

#### 4. Required Corrections

What corrective actions will be taken to prevent recurrence of accident? See Reverse Side, Item 35, for basic correction ideas.  
(Ex., Job Safety Analysis (JSA), Training, Employee counseling, Machine Guarding)

### Part 3. Witnesses:

### Part 4. Accident Location Sketch

N  
↑

### Part 5. Extent and Outcome of Injury/Illness

#### Lost Time Case

- Date Lost Time Began: \_\_\_\_/\_\_\_\_/\_\_\_\_  
- Date Lost Time Ended: \_\_\_\_/\_\_\_\_/\_\_\_\_

#### Restricted Duty Case

Date Restriction Began: \_\_\_\_/\_\_\_\_/\_\_\_\_  
Date Restriction Ended: \_\_\_\_/\_\_\_\_/\_\_\_\_

Restrictions:

#### Medical Treatment

- Name of Hospital or Clinic:

- Name of Physician:

Describe Treatment:

Was employee treated in an Emergency Room? Yes No Was employee hospitalized overnight as an in-patient? Yes

**WRS INFRASTRUCTURE & ENVIRONMENT, INC.  
DAILY SAFETY MEETING**

Date: \_\_\_\_\_ Job Name: \_\_\_\_\_

1. Work to be completed: \_\_\_\_\_  
\_\_\_\_\_

2. Hazards Associated with this work: \_\_\_\_\_  
\_\_\_\_\_

3. Hazard control measures to be implemented: \_\_\_\_\_  
\_\_\_\_\_

**SAFETY TOPICS PRESENTED**

Protective Clothing/Equipment: \_\_\_\_\_  
\_\_\_\_\_

Chemical Hazards: \_\_\_\_\_  
\_\_\_\_\_

Physical Hazards: \_\_\_\_\_  
\_\_\_\_\_

Emergency Procedures: \_\_\_\_\_  
\_\_\_\_\_

<b>ATTENDEES</b>	
<b><u>NAME PRINTED</u></b>	<b><u>SIGNATURE</u></b>
_____	_____
_____	_____
_____	_____
_____	_____

**WRS INFRASTRUCTURE &  
ENVIRONMENT, INC.**

TRAINING ATTENDANCE RECORD

Class Title:\_\_\_\_\_

Class Content:\_\_\_\_\_

Class Instructor(s):\_\_\_\_\_

\_\_\_\_\_

Date:\_\_\_\_\_

ATTENDED BY

NAMES (PRINTED)	SIGNATURES
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Instructor(s) Signature:\_\_\_\_\_

\_\_\_\_\_

Date(s):\_\_\_\_\_

cc: Corporate File  
Branch File

**WRS INFRASTRUCTURE & ENVIRONMENT, INC.**  
**RESPIRATOR FIT TESTING & INSPECTION**

NAME \_\_\_\_\_ EMPLOYEE NO. \_\_\_\_\_ DATE \_\_\_\_\_

TITLE \_\_\_\_\_ SERVICE CENTER \_\_\_\_\_

HOOD/ ENCLOSURE MAY NOT BE USED WITH IRRITANT SMOKE.

**IRRITANT SMOKE FIT TESTING:**

<u>No. of Squeezes</u>	<u>Activity</u>	<u>Reaction</u>
_____	Initial	___ Yes ___ No
_____	Head/Neck Motion	___ Yes ___ No
_____	Motion/Talking	___ Yes ___ No
_____	Motion/Deep Breathing	___ Yes ___ No
_____	Total Squeezes	
Seal Obtained _____	Type of Cartridge used	_____
	Type of respirator	_____
	Size of respirator	_____

**RESPIRATOR INSPECTION:**

Head Straps	<u>ok / not ok</u>	Inhalation valves/stems/bodies	<u>ok / not ok</u>
Face to Mask Sealing Surface	<u>ok / not ok</u>	Canister holder gasket/ threads	<u>ok / not ok</u>
Exhalation valves/cover/stems/bodies	<u>ok / not ok</u>	Lens	<u>ok / not ok</u>

Action Taken to Correct Deficiencies: \_\_\_\_\_

Fit Test/ Inspection performed by: \_\_\_\_\_ Date \_\_\_\_\_

Employee signature: \_\_\_\_\_ Date \_\_\_\_\_

**WRS INFRASTRUCTURE & ENVIRONMENT, INC.**  
**Daily Safety Report**

<b>Project:</b>		
<b>Contract No.:</b>	<b>WRS Project No.:</b>	<b>Date:</b>
<b>SHSO:</b>	<b>PM:</b>	<b>Supervisor:</b>
<b>Site Conditions (weather, temp., soil conditons, etc.):</b> _____		

Task/ Personnel/ PPE Matrix		
Task/Area	Personnel	PPE Level

Corrective Actions	
Unsafe Act/ Condition	Corrective Action

<b>Signature:</b> _____ <div style="text-align: center;">SHSO</div>	<b>Date:</b> _____
<b>Attachments:</b> <b>! Air Surveillance Log ! Accident Report ! Daily Safety Meeting ! Other ! None</b>	

**WRS Infrastructure & Environment, Inc.**  
**H&S Plan Change Authorization**

Project Name: \_\_\_\_\_

Date: \_\_\_\_\_

Project Number: \_\_\_\_\_

**Description of Change:**

**Reason for Change:**

\_\_\_\_\_  
Person requesting Change:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Approved By  
(WRS Health and Safety Administrator)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Attach sheets if necessary



## SAFETY BRIEFING

Project Name: \_\_\_\_\_ Date: \_\_\_\_\_

The following personnel were present at the pre-job safety briefing and having read the Health and Safety Plan, are familiar with its provisions, and will abide by the procedures set forth in this plan:

**Name**

**Signature**

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Printed name of Site Supervisor or Site Health and Safety Officer

Signature

---

Date \_\_\_\_\_

## Health and Safety Plan Sign-off

By signing below, I am indicating that I have read and agree to comply with the contents of the Site Specific Health and Safety Plan prepared for the Project.

[illegible]

**WRS Infrastructure & Environment, Inc.**  
**Air Monitoring Log**

<b>Project Site:</b>	<b>Project No.</b>	<b>Date:</b>

<b>Level of Protection:</b>	<b>Description of Site (e.g. weather, temp., soil conditions):</b>

Instrument:	Instrument Response:	Location:	Time:	Comments:

<b>Calibration Data (e.g. type &amp; gas concentration, instrument adjustments if any):</b>

<b>Additional Notes:</b>

Signature: \_\_\_\_\_  
 (Health and Safety Officer)

Date: \_\_\_\_\_

**WRS Infrastructure & Environment, Inc.  
Quantitative Fit Testing Certificate**

**Employee**

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Employee**

**Dept.:** \_\_\_\_\_

**No.:** \_\_\_\_\_

**Quantitative Fit Testing Device:** DNI Nevada Fit Tester 3000 (Controlled Negative Pressure)

**Test Parameters**

**Work Rate:** Heavy 300 kcal/ hr.

**Cartridge Type:** Hi (Combination)

**Mask Type:** Full Face or Half Face

**Challenge Pressure:** \_\_\_\_\_ " H2O

**Manufacturer:** \_\_\_\_\_

**Breathing Rate:** \_\_\_\_\_ LPM

**Model:** \_\_\_\_\_

**Gender:** \_\_\_\_\_

**Size:** \_\_\_\_\_

**Minimum Passing Fit Factor:** 500

**18 Step Protocol Exercises & Tests**

<b>Step 1: Breathing 60 seconds</b>	<b>Step 10: Test Face Forward</b> FF: _____ Test Q: _____
<b>Step 2: Test Face Forward</b> FF: _____ Test Q: _____	<b>Step 11: Grimace 20 seconds</b>
<b>Step 3: Move Head Side to Side 60 seconds</b>	<b>Step 12: Test Face Forward</b> FF: _____ Test Q: _____
<b>Step 4: Test Face Left</b> FF: _____ Test Q: _____	<b>Step 13: Bend at Waist 30 seconds</b>
<b>Step 5: Test Face Right</b> FF: _____ Test Q: _____	<b>Step 14: Test Face Forward</b> FF: _____ Test Q: _____
<b>Step 6: Move Head Up &amp; Down 60 seconds</b>	<b>Step 15: Jog in place 30 seconds</b>
<b>Step 7: Test Head Up</b> FF: _____ Test Q: _____	<b>Step 16: Test: Face Forward</b> FF: _____ Test Q: _____
<b>Step 8: Test Head Down</b> FF: _____ Test Q: _____	<b>Step 17: Re-don Respirator 60 seconds</b>
<b>Step 9: Reading 30 seconds</b>	<b>Step 18: Test Face Forward</b> FF: _____ Test Q: _____

**Average of Fit Test Exercises**

**Average % Leak:** \_\_\_\_\_ **Test Quality:** \_\_\_\_\_ **Equivalent Fitfactor:** \_\_\_\_\_

**Employee Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Tester's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## **APPENDIX B HEAT STRESS**

**CONTENTS**

1.0 PURPOSE

2.0 SCOPE

3.0 DEFINITIONS

4.0 RESPONSIBILITIES

5.0 PROCEDURE

6.0 REFERENCES

7.0 ATTACHMENTS

8.0 RECORD KEEPING

9.0 EQUIPMENT

## ***WRS Heat Stress Management Standard Operating Procedure***

### **1.0 PURPOSE**

The Heat Stress Management SOP is intended to describe measures which will reduce the probability of workers experiencing a heat related disorder.

### **2.0 SCOPE**

The Heat Stress Management SOP is applicable to all WRS project sites. Its implementation is mandatory when workers wearing impermeable personal protective equipment are exposed to ambient air temperatures above 70°F.

### **3.0 DEFINITIONS**

***Stress*** can contribute significantly to accidents or harm workers in other ways.

The term "stress" denotes the physical (gravity, mechanical force, heat, cold, pathogens, injury) and psychological (fear, anxiety, crises, joy) forces that are experienced by individuals.

The body's response to stress occurs in three stages:

- a. Alarm Reaction - The body recognizes the stress and the pituitary-adreno-cortical system responds by increasing the heart rate and blood sugar level, decreasing digestive activity and dilating the pupils.
- b. Adaptive Stage - The body repairs the effect of stimulation and stress symptoms disappear.
- c. Exhaustion Stage - The body can no longer adapt to stress and the individual may develop emotional disturbances and cardiovascular and renal diseases.

The most common types of stress that affect remediation personnel are heat stress and cold stress. Heat and cold stress can be the most serious hazards an employee encounters at hazardous waste sites.

***Heat Stress*** usually is a result of protective clothing decreasing natural body ventilation, although it may occur at any time work is being performed at elevated temperatures.

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal. Because heat stress is one of the most common and potentially serious illnesses at hazardous waste sites, regular monitoring and other preventative measures are vital.

Site workers must learn to recognize and treat various forms of heat stress.

### **4.0 RESPONSIBILITIES**

The Project Manager/ Supervisor is responsible for directing work in accordance with this procedure when implementation conditions are met. The PM is also responsible for providing resources necessary for implementation of the procedure.

The Site Health and Safety Officer is responsible for monitoring and facilitating employee compliance with the procedure. The SHSO is responsible for instructing employees in the recognition and control of heat related illnesses.

### **5.0 PROCEDURE**

## **5.1 Symptom Recognition and Treatment**

A large portion of heat stress control lies in the ability of an individual to recognize heat stress symptoms in themselves and co-workers. Early recognition and treatment of heat stress symptoms can prevent the development of more serious, debilitating and even life threatening conditions.

### **5.1.1 Heat Stroke**

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the heat regulating mechanisms of the body. The individual's temperature control system that causes sweating stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly. Heat stroke requires medical attention.

- a. Symptoms - Red, hot dry skin, although person may have been sweating earlier. Nausea, dizziness, confusion, extremely high body temperature, rapid respiratory and pulse rate, convulsions, unconsciousness, or coma.
- b. Treatment - Cool the victim quickly. If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the victim in cool, but not cold, water; sponge the body with cool water; or pour water on the body to reduce the temperature to a safe level (102°F). Observe the victim and obtain medical help. Do not give coffee, tea, or alcoholic beverages. Do give fluids by mouth if victim is in and out of consciousness

### **5.1.2 Heat Exhaustion**

Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. This condition is much less dangerous than heat stroke, but it nonetheless must be treated.

- a. Symptoms - Pale, clammy moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, breathing is shallow. The person may have a headache, may vomit, and may be dizzy.
- b. Treatment - Remove the person to a cool, air-conditioned place, loosen clothing, place in a head-low position, and provide bed rest. Consult a physician, especially in severe cases. The normal thirst mechanism is not sensitive enough to ensure body fluid replacement. Have the patient drink one to two cups of water immediately and every 20 minutes thereafter until symptoms subside. Total water consumption should be about one to two gallons per day.

### **5.1.3 Heat Cramps**

Heat cramps are caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke.

- a. Symptoms - Acute painful spasms of voluntary muscles: e.g., abdomen and extremities.
- b. Treatment - Remove the victim to a cool area and loosen clothing. Have the patient drink one to two cups of water immediately and every 20 minutes thereafter until the symptoms subside. Total water consumption should be one to two gallons per day. Consult your physician.

### **5.1.4 Heat Rash**

Heat rash is caused by continuous exposure to heat and humid air and is aggravated by chafing cloths. The condition decreases the ability to tolerate heat.



## ***WRS Heat Stress Management Standard Operating Procedure***

- a. Symptoms - Mild red rash, especially in areas of body in contact with protective gear.
- b. Treatment - Decrease the amount of time in protective gear and provide powder to help absorb moisture and decrease chafing.

### **5.2 Heat Stress Prevention Measures**

What follows is a list of heat stress prevention measures which reduce the risk of an employee experiencing a heat related disorder. They are in no particular order. Successful heat stress prevention will require the implementation of all the control measures listed to varying degrees. No single control measure will prove to be either effective nor efficient for a given project site.

#### **5.2.1 Fluid Replacement**

Have workers drink 16 ounces of water before beginning work, such as in the morning or after lunch. Provide disposable, four ounce cups and water that is maintained at 50 to 60°F. Urge workers to drink one to two gallons per day. To assist employees track their own fluid replacement, provide individual water coolers/ containers, fill the containers each day, and check consumption at the end of the day. The use of paper cups and a single cooler for the entire job site are difficult for both supervisors and employees to track. Provide cool, preferably air-conditioned, area for rest breaks. Discourage the use of alcohol in nonworking hours and discourage the intake of coffee during working hours. Monitor for signs of heat stress.

Use of electrolyte containing fluids (e.g., Gatorade) is more important for unacclimatized workers than acclimatized workers.

#### **5.2.2 Acclimate Crew Members**

Acclimatization is the process by which the body adapts to heat stress. Changes include increased sweating efficiency (earlier onset of sweating, increased sweat production, lower electrolyte loss) and stabilized blood circulation (less likelihood of blackout, dizziness, spots, etc.) It occurs with brief (~100 minutes) daily exposures to heat in 5 -7 days. Benefits of acclimatization are typically lost with no heat exposure for a week or more.

#### **5.2.3 Reduce Heat Load (both environmental and metabolic)**

Provide cooling devices to aid body cooling (i.e., Cool Vests). These devices, however, add weight, and their use should be balanced against worker efficiency.

Evaporative cooling is aided by clothing which wicks away perspiration from the skin. Long cotton underwear acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing. However, long cotton underwear is of no use and can aggravate heat stress symptoms once it becomes soaked with perspiration.

Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing.

In hot weather, conduct field activities in the early morning or evening.

## ***WRS Heat Stress Management Standard Operating Procedure***

Reduce metabolic heat load by designing tasks such that employee exertion is kept to a minimum

Reduce environmental heat loads by reducing radiant heat exposure (sunshine). Working in shaded areas and taking breaks in shaded areas will reduce heat loads due to radiant heat.

### **5.2.4 Employee Rotation**

In hot weather, rotate shifts of workers wearing impervious clothing. On project sites with large crews, stagger heat stress breaks so that tasks are not completely shut down. On sites with small crew sizes this may not be possible due to the “buddy system” rule.

### **5.2.5 Dry Clothing and Personal Hygiene**

Good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

### **5.2.6 Avoid Diuretics and Stimulants**

Avoid consuming alcoholic beverages which cause loss of body fluid water by urination. Avoid consumption of stimulants such as some cold medicines and caffeine which increase heart rates.

### **5.2.7 Heat Stress Monitoring and Work/ Rest Cycle Management**

For strenuous field activities that are part of on-going work activities in hot weather, the following procedures shall be used to monitor the body's physiological response to heat and to manage the work/ rest cycle. These procedures are to be instituted when ambient temperatures exceed 70°F and employees are wearing impervious (i.e., does not allow perspiration to evaporate) clothing (e.g., Tyvek, Saranex, PE Coated Tyvek, etc., coveralls).

- a. Measure Heart Rate (HR) - The heart rate should be measured by the radial pulse at the wrist for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.
- b. Measure Body Temperature - Body temperature should be measured orally or aurally by a clinical thermometer as early as possible in the resting period. The temperature (OT) at the beginning of the rest period should not exceed 99.6°F, if it does, the next work period should be shortened by 33% while the length of the rest period stays the same. If the OT exceeds 99.6°F at the beginning of the next period, the following work cycle should be further shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F. Consuming fluids immediately prior to temperature measurement will give false, low readings. No one will continue to be exposed to hot conditions with an oral/ aural temperature in excess of 100.6°F.

## ***WRS Heat Stress Management Standard Operating Procedure***

- c. Rest Areas - Rest areas should be air conditioned if possible. The heart rates of workers who recover in air conditioned areas will be reduced faster and to lower rates than those that recover in non-air conditioned areas.
- d. Manage Work/Rest Schedule - The following work/rest schedule shall be used as a guideline:

<b><u>Adjusted Temperature (°F)</u></b>	<b><u>Active Work Time Using Impermeable Protective Gear</u></b>
75 or less	50
80	40
85	30
90	20
95	10
100	0

To calculate the adjusted temperature:

$$T(\text{adjusted}) = T(\text{actual}) + (13 \times \text{fraction sunshine})$$

Measure the air temperature with a standard thermometer. Estimate the fraction of sunshine by judging what percent the sun is out: 100% sunshine = no cloud cover = 1.0, 50% sunshine = 50% cloud cover = 0.5, and 0% sunshine = full cloud cover = 0.0.

Reduce or increase the work cycle according to the guidelines under heart rate and body temperature.

### 6.0 REFERENCES

- Occupational Safety and Health and Guidance Manual for Hazardous Waste Site Activities
- Patty's Industrial Hygiene and Toxicology, Fourth Edition
- OSHA Web Site <http://www.osha-slc.gov/SLTC/heatstress/index.html>

### 7.0 ATTACHMENTS

None

### 8.0 RECORD KEEPING

Records which facilitate the tracking of employee fluid consumption and work/ rest cycles will be generated.

### 9.0 EQUIPMENT

- Oral thermometers and hygienic slip covers or aural thermometers with hygienic slip covers
- Thermometer to measure air temperature
- Cool water and/ or electrolyte containing fluids (e.g., Gatorade)
- Ice cooled vests
- Materials to create shaded work areas

**APPENDIX C**  
**LOCKOUT/ TAGOUT**  
**WRS STANDARD OPERATING PROCEDURE**

## **CONTENTS**

- 1.0 **PURPOSE**
- 2.0 **SCOPE**
- 3.0 **DEFINITIONS**
- 4.0 **RESPONSIBILITIES**
- 5.0 **PROCEDURE**
- 6.0 **REFERENCES**
- 7.0 **ATTACHMENTS**
- 8.0 **RECORD KEEPING**
- 9.0 **EQUIPMENT**

## 1.0 PURPOSE

WRS recognizes the hazards of unexpected:

- energization
- machine startup and/or
- release of stored energy

during service or maintenance activities on equipment/machines. The following Standard Operating Procedure: Control of Hazardous Energy - Lockout/Tagout, has been developed to provide for the isolation of all energy sources that could endanger employees.

This procedure establishes minimum requirements for the lockout and/or tagout of energy isolating devices and systems. Lockout and/or tagout shall be used to ensure that all equipment, machinery, systems and facilities are inoperable and isolated from all potentially hazardous energy. The Lockout/Tagout procedure shall be implemented before employees perform service or maintenance activities where the unexpected energization, start-up or release of stored energy could cause personal injury and/or damage to equipment, machinery, facilities or the environment.

## 2.0 SCOPE

- A. Provisions outlined in this SOP include individual responsibilities, instructions for the implementation and removal of energy control procedures and employee training requirements.
- B. Employees Covered - This procedure applies to all WRS employees and sub-contractors to the same.
- C. Activities Covered

Service and maintenance activities on machines, equipment, systems and facilities during which the unexpected energization, start-up or release of stored energy could cause injury to employees must be conducted under the protection of a Lockout/Tagout SOP.

Operation/Production activities during which an employee must remove or bypass a guard or other safety device, or place his/her body into an area of machinery/equipment where work is actually performed upon the material being processed (point of operation) must also be conducted in accordance with a Lockout/Tagout SOP.

- D. This SOP is generic in nature and applies to the portion of scenarios described above which meet the following criteria:
  - 1. The machine, equipment or facility component has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees;
  - 2. The machine, equipment or facility component has a single energy source which can be readily identified and isolated;
  - 3. The isolation and locking out of that energy source will completely de-energize and deactivate the machine, equipment or facility component;
  - 4. The machine, equipment or facility component is isolated from that energy source and locked out during servicing, maintenance or site operations;

5. A single lockout device will achieve a lock-out condition;
  6. The lockout device is under the exclusive control of the authorized employee performing the servicing, maintenance or site operation;
  7. The servicing, maintenance or site operation does not create additional hazards for other employees; and
  8. Utilization of this procedure has resulted in no accidents involving the unexpected activation or re-energization of an electrical source during servicing, maintenance or site operations.
- E. Activities which do not conform to these criteria must be conducted under equipment/machinery specific lockout/tagout procedures.

### 3.0. DEFINITIONS

AFFECTED EMPLOYEES - WRS employee and/or a subcontractor employee whose job includes activities such as operating machines or equipment on which servicing or maintenance is being performed under lockout or tagout action or whose job requires the employee to work in an area in which servicing or maintenance or site operations are being performed.

AUTHORIZED EMPLOYEE - An employee who locks or implements a tagout system procedure on electrical sources to perform the servicing or maintenance of the equipment, or site operations. An authorized employee and an affected employee may be the same person when the affected employee's duties also include performing maintenance, service on machinery/equipment or site operations which must be locked or a tagout system implemented. The authorized employee shall be properly trained and approved to apply and remove locks and tags.

BLANK - To introduce an obstruction or to replace an opening with a solid surface to prevent flow (e.g. pipeblank).

CAPABLE OF BEING LOCKED OUT - An energy isolating device will be considered to be capable of being locked out if it has a hasp or other attachment where a lock can be affixed, or has a locking mechanism built in.

DOUBLE ISOLATION - To isolate by closing two valves or inserting a blank within an area of two valves.

ENERGY ISOLATING DEVICE - A physical device which prevents the transmission or release of energy. Examples include, but are not limited to, restrain blocks, electrical circuit breakers, disconnect switches, slide gates, or line valves. Where possible, they shall provide visible indication of the position of the device. Push-buttons, selector switches, check valves, and other portions of the control circuit shall not be considered energy isolating devices.

ENERGY SOURCE - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

LOCKOUT - The placement of a lockout device on an energy isolation device, in accordance with an established procedure.

LOCKOUT DEVICE - A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe "off" position for the purpose of protecting personnel.

TAGOUT - The placement of a tagout device on an energy isolation device in accordance with an established procedure. (See Attachment B for a suggested lockout/tagout tag.)

**TAGOUT DEVICE** - A prominent warning device, such as a tag and a means of attachment which can be securely fastened to an energy isolating device in accordance with the established procedure.

- Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal.
- Tagout devices' attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable, with a minimum unlocking strength of no less than fifty pounds.
- Tagout devices shall have the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.

**ZERO ENERGY STATE** - Removal of all potential energy within the designated area of a lockout or tagout.

#### **4.0 RESPONSIBILITY**

Appropriate (authorized and affected) employees shall be instructed in the safety significance of the lockout/tagout procedure. Each new or transferred affected employee and other employees whose work operations are or may be in the area shall be instructed in the purpose and use of the lockout/tagout procedure.

- A. Affected Employees - shall conduct themselves in a manner which does not jeopardize the effectiveness of the Lockout/Tagout procedure. Assist Authorized Employees in the successful application, use and removal of the Lockout/Tagout SOP.
- B. Authorized Employees - shall be familiar with that particular equipment and processes that are being locked/tagged out, and with the means and methods to isolate the energy source. Shall conduct service, maintenance and operation activities covered by this SOP in strict accordance with its provisions.
- C. Industrial Hygiene and Safety Officer (IH&SO) - shall provide consultation to Operations Management on determining the applicability of this SOP to a particular activity. Develop equipment/machinery specific Lockout/Tagout SOPs not covered under this SOP. Assist Operations Management in determining the effectiveness of this SOP for a particular activity, conduct and/or coordinate the training of Authorized and Affected Employees. Audit and report on the effectiveness of the Lockout/Tagout SOP and training activities.
- D. Operations Management - shall identify, with IH&SO's assistance, activities covered under this SOP and shall inform Affected and Authorized employees of same. Shall identify to the IH&SO and provide access to employees in need of training. Shall assign work activities to Authorized and Affected Employees in accordance with this SOP. Shall identify to the IH&SO machinery/equipment in need of SOPs beyond the scope of this SOP and assist in their preparation. Shall inform outside servicing personnel or contractors of this procedure whenever they are engaged in activities covered by the scope of this procedure.

#### **5.0 PROCEDURE**

##### **5.1 TRAINING**

Each WRS site/location shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the safe application, usage and removal of energy controls are acquired by the employees. Proper documentation with content and person's signature is required.



- A. The training shall include the following:
1. Each authorized employee shall receive training in the recognition of applicable hazardous energy sources.
  2. Each affected employee shall be instructed on the purpose and use of the energy control procedure.
  3. All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed concerning the procedure.
- B. Additional training requirements when using Tagout Systems shall include the following:
1. Tags are warning devices and do not provide physical restraint as would be provided by a lock.
  2. A tag shall not be removed without written approval of the authorized person responsible.
  3. Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are in the area.
  4. Tags and their means of attachment must be made of materials which will withstand the environmental conditions.
- C. Additional retraining shall be conducted:
1. Whenever there is a change in an employee's job assignment.
  2. Based on changing job assignments, methods of control and/or whenever a periodic inspection reveals a deviation from the energy control procedure.
- D. Training on the use of the Energy Control Procedures shall be certified by WRS. The certification shall contain each employee's name, signature and date of training.
- All WRS employees shall receive training sufficient to undertake the activities of an Authorized employee under this generic SOP.

## 5.2 APPLICATION OF THE ENERGY CONTROL PROCEDURE

The following steps shall be followed in the application of the lockout or tagout system.

- A. Preparation for Shutdown - Authorized and affected employees shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.
- B. Machine or Equipment Shutdown - Machines or equipment shall be turned off or shut down using point of operation control switches.
- C. Machine or Equipment Isolation - The energy isolating device for the machine or equipment shall be physically located and operated to ensure that the machine or equipment is isolated from the energy source.

- D. Lockout or Tagout Device - The lockout or tagout device shall be affixed to each energy isolating device by authorized employees. The device shall be affixed in a manner that will hold the energy isolating device in a safe or off position.
- E. Full Employee Protection - When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program.

Means to be considered as part of the demonstration of full employee protection shall include the implementation of additional safety measures such as:

- Removal of an isolating circuit element
  - Blocking of a controlling switch
  - Opening of an extra disconnecting device
  - Removal of a valve handle.
- F. Stored Energy - All potentially hazardous stored or residual energy shall be relieved, disconnected and rendered safe.
- G. Isolation of Energy Verification - Prior to starting work on machines or equipment, the authorized employee shall verify (per Section entitled "Removal of Lockout or Tagout Devices") that isolation and de-energization of the machine, equipment or electrical source has been accomplished.

### 5.3 REMOVAL OF LOCKOUT OR TAGOUT DEVICES

Before lockout or tagout devices are removed and energy is restored, the following procedures shall be followed:

- A. Employees
- The work area shall be checked to ensure that all employees have been safely positioned or removed from the area.
  - All affected employees shall be notified that the lockout or tagout devices have been removed before any machine, equipment or electrical source is energized.
- B. The Machine or Equipment
- The work area shall be inspected to ensure that all non-essential items have been removed and the machine or equipment is ready for operation.
- C. Removing the Lockout or Tagout Device
- Each lockout or tagout device shall be removed by the authorized employee who applied the device.

### 5.4 REMOVAL OF LOCKOUT OR TAGOUT DEVICE BY ANOTHER EMPLOYEE

When the authorized employee who applied the lockout or tagout device is not available to remove it, the following procedure must be in place with specific training for such removal.

- Verify by visual inspection or equivalent that the authorized employee who applied the device is not at the facility.
- Make a reasonable effort to contact and notify the authorized employee that the lockout or tagout device has been removed.
- Notify that employee's supervisor.
- Before resuming work, ensure that the authorized employee knows that the device has been removed.

## 5.5 GROUP LOCKOUT OR TAGOUT

When servicing and/or maintenance is performed by a crew, craft or other group, they shall utilize a procedure which affords the employees a level of protection that is equivalent to that provided by the implementation of a personal lockout device.

Group lockout or tagout procedures shall include the following specific requirements:

- An employee will be assigned primary responsibility as an authorized employee for a set number of employees working under the protection of a group lockout or tagout device.
- This employee will maintain a roster of group members and their job assignments.
- When more than one crew, craft, or department is involve, assignment of overall job-associated lockout or tagout control responsibility shall be designated to an authorized employee to coordinate affected work forces and ensure continuity of protection.
- Each authorized employee shall affix a personal lockout or tagout device to the group lockbox or device, group lockout box, or comparable mechanism on the machine or equipment being serviced or maintained.

## 5.6 OUTSIDE PERSONNEL (CONTRACTORS)

- All outside servicing personnel (contractors) and WRS personnel shall inform each other of their respective lockout or tagout procedures.
- All WRS locations and or facilities shall ensure that the employees understand and comply with the restriction and prohibitions of the outside contractor's energy control procedures.

**Table I**  
**LOCKOUT OR TAGOUT SEQUENCE**

NOTIFY EMPLOYEES	ACTION
Site Supervisor	A. Notifies all personnel affected by the lockout or tagout application and the reason therefore.
<b>SHUTDOWN PROCESS OR EQUIPMENT</b>	
Authorized Employee	A. Turns off or returns operating controls to the neutral mode using appropriate equipment/process shutdown procedures. B. Operates switches and/or valves or any other energy isolating device(s) so that the equipment is isolated from its energy source(s).
<b>PLACE LOCKOUT AND/OR TAGOUT</b>	
Authorized employee	A. Applies safety locks and tags in all cases as required to isolate all energy devices. The lockout or tagout must be visible and accessible to anyone attempting to operate the isolated device.
<b>VERIFY THE ABSENCE OR CONTROL OF ENERGY</b>	
Authorized employee	A. Checks or tests all systems after the lockout and tagging procedures have been completed to insure that total energy isolation has occurred. <b>CAUTION:</b> Return operating control to neutral or off position, after verification of energy isolation.
<b>REMOVE LOCKOUT/TAGOUT DEVICES</b>	
Authorized Employee	A. Checks the area around the machine or equipment to ensure that no one is exposed. B. Removes all tools from machines or equipment. Ensures all guards have been reinstalled and employees are in the clear. C. Ensures that all pipes that were opened for repair or draining purposes are closed and connected properly. D. Ensures that all controls are in off position or neutral position. E. Removes safety locks and/or tags. F. Operates the energy isolating devices to restore energy to the machine or equipment
<b>ADMINISTER LOCKOUT/TAGOUT DEVICES</b>	
Site Supervisor	A. Maintains a lockout or tagout log at the lock cabinet. B. Schedules and performs surveillances so that proper lock and tag procedure is being followed. C. Schedules and performs audits of the proper lock and tag procedure.

## 5.7 PROCEDURE INVOLVING MORE THAN ONE PERSON

Each individual working on equipment or processes shall be required to place his/her own personal lockout device or tagout device on the energy isolating device.

When an energy isolating device cannot accept multiple locks or tags, a multiple lockout or tagout device (hasp) may be used. If a lockout is used, a single lock may be used with the key being placed in a lockout box or cabinet which allows the use of multiple locks to secure it. Each employee will use his/her own lock to secure the box or cabinet.

## 6.0 REFERENCES

- 29 CFR 1910.147

- OSHA Web Page <http://www.osha-slc.gov/SLTC/controlhazardousenergy/index.html>

## 7.0 ATTACHMENTS

- Training Outline
- Sample Tag

## 8.0 RECORD KEEPING

- Employee training evets
- Inspections of ongoing LOTO's

## 9.0 EQUIPMENT

- Lockout device (e.g., hasp)
- Lock

## **ATTACHMENT A**

### **Training Outline**

CONTROL OF HAZARDOUS ENERGY  
LOCKOUT/TAGOUT  
Training Outline

I. Hazard Recognition

A. Recognize the Scenario

1. Unexpected Energization

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2. Unexpected Machine Startup

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3. Release of Stored Energy

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4. Our Equipment vs. Our Clients Equipment

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5. Suspect Activities

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B. Recognize the Energy

1. Electric

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2. Hydraulic

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3. Pneumatic

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4. Mechanical

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5. Thermal

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6. Chemical

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7. Combinations

II. Hazard Control Standard Operating Procedure

A. Activities Covered

B. Definitions

1. Affected Employees

2. Authorized Employees

3. Blank

4. Capable of Being Locked Out

5. Double Isolation

6. Energy Isolating Device

7. Lockout

8. Lockout Device

9. Tagout

10. Tagout Device



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Zero Energy State

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### C. Lockout/Tagout Sequence

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Shutdown Process or Equipment

Place Lockout/Tagout Device

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Remove Lockout/Tagout Devices

#### D. Activities Not Covered by SOP

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### E. Removing Another Employee's Lock/Tag

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## F. Group Lockout/Tagout

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G. Outside Personnel (Subcontractors, Clients)

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## ATTACHMENT B

**Tag**

[illegible]

**APPENDIX D**  
**WRS FALL PROTECTION**  
**STANDARD OPERATING PROCEDURE**

## **CONTENTS**

1.0 **PURPOSE**

2.0 **SCOPE**

3.0 **DEFINITIONS**

4.0 **RESPONSIBILITIES**

5.0 **PROCEDURE**

- 5.1 Training
- 5.2 Gaurdail Systems
- 5.3 Safety Net Systems
- 5.4 Personal Fall Arrest Systems
- 5.5 Positioning Device Systems
- 5.6 Warning Line Systems
- 5.7 Controlled Access Zones
- 5.8 Safety Monitoring Systems
- 5.9 Covers
- 5.10 Protection from Falling Objects
- 5.11 Fall Protection Plans

6.0 **REFERENCES**

7.0 **ATTACHMENTS**

8.0 **RECORD KEEPING**

9.0 **EQUIPMENT**

## **1.0 PURPOSE**

This procedure establishes minimum requirements to prevent injuries to employees from different level falls. It also defines minimum requirements for complying with OSHA's Fall Protection Standard (29 CFR 1926 Subpart M).

## **2.0 SCOPE**

This procedure applies to all WRS employees and WRS subcontractor employees exposed to the following workplace conditions:

*Unprotected Sides and Edges* - employees on walking/working surfaces (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level.

*Leading Edge Work* - employees constructing a leading edge 6 feet (1.8 m) or more above lower levels.

*Work In Hoist Areas* - employees in a hoist area shall be protected from falling 6 feet (1.8 m) or more to lower levels.

*Holes* - employees on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet (1.8 m) above lower levels. Employees on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) Employees on a walking/working surface shall be protected from objects falling through holes (including skylights).

*Formwork and Reinforcing Steel* - employees on the face of formwork or reinforcing steel shall be protected from falling 6 feet (1.8 m) or more to lower levels.

*Ramps Runways and Other Walkways* - employees on ramps, runways, and other walkways shall be protected from falling 6 feet (1.8 m) or more to lower levels.

*Excavations* - employees at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier.

*Wells, Pits and Shafts* - employees at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8 m) or more in depth shall be protected from falling.

*Work Above Dangerous Equipment* - employees working less than 6 feet (1.8 m) above dangerous equipment shall be protected from falling into or onto the dangerous equipment Employees working 6 feet (1.8 m) or more above dangerous equipment shall be protected from fall hazards.

*Roof Work* - employees engaged in roofing activities on low-slope roofs, with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling. Employees on a steep roof with unprotected sides and edges 6 feet (1.8 m) or more above lower levels shall be protected from falling.

*Precast Concrete Erection* - employees engaged in the erection of precast concrete members (including, but not limited to the erection of wall panels, columns, beams, and floor and roof "tees") and related operations such as grouting of precast concrete members, who are 6 feet (1.8 m) or more above lower levels shall be protected from falling.

*Wall Openings* - employees working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet (1.8 m) or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches (1.0 m) above the walking/working surface, shall be protected from falling.

*Walking/ Working Surfaces Not Otherwise Addressed* - employees on a walking/working surface 6 feet (1.8 m) or more above lower levels shall be protected from falling

### **3.0 DEFINITIONS**

*Anchorage* - means a secure point of attachment for lifelines, lanyards or deceleration devices.

*Body belt (safety belt)* - means a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.

*Body harness* - means straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

*Buckle* - means any device for holding the body belt or body harness closed around the employee's body.

*Connector* - means a device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or dee-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).

*Controlled access zone (CAZ)* - means an area in which certain work (e.g., overhand bricklaying) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

*Dangerous equipment* - means equipment (such as pickling or galvanizing tanks, degreasing units, machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment.

*Deceleration device* - means any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

*Deceleration distance* - means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate.

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It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

*Equivalent* - means alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.

*Failure* - means load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

*Free fall* - means the act of falling before a personal fall arrest system begins to apply force to arrest the fall.

*Free fall distance* - means the vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

*Guardrail system* - means a barrier erected to prevent employees from falling to lower levels.

*Hole* - means a gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, roof, or other walking/working surface.

*Infeasible* - means that it is impossible to perform the construction work using a conventional fall protection system (i.e., guardrail system, safety net system, or personal fall arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.

*Lanyard* - means a flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

*Leading edge* - means the edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

*Lifeline* - means a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

*Low-slope roof* - a roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

*Lower levels* - means those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

*Mechanical equipment* - means all motor or human propelled wheeled equipment used for roofing work, except wheelbarrows and mopcars.

*Opening* - means a gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.

*Overhand bricklaying and related work* - means the process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending and electrical installation incorporated into the brick wall during the overhand bricklaying process.



*Personal fall arrest system* - means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

*Positioning device system* - means a body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

*Rope grab* - means a deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

*Roof* - means the exterior surface on the top of a building. This does not include floors or formwork which, because a building has not been completed, temporarily become the top surface of a building.

"Roofing work" means the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

*Safety-monitoring system* - means a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

*Self-retracting lifeline/lanyard* - means a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

*Snaphook* - means a connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snaphooks must be the self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection.

*Steep roof* - means a roof having a slope greater than 4 in 12 (vertical to horizontal).

*Toeboard* - means a low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

*Unprotected sides and edges* - means any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches (1.0 m) high.

*Walking/working surface* - means any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

*Warning line system* - means a barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

*Work area* - means that portion of a walking/working surface where job duties are being performed.

#### **4.0 RESPONSIBILITY**

All WRS employees and subcontractor employees covered by this SOP are responsible for complying with its contents. Supervisors are responsible for implementing and enforcing the SOP and securing the resources necessary to implement it.

## **5.0 PROCEDURE**

### **5.1 TRAINING**

Employees with potential exposure to fall hazards shall receive training that will enable them to recognize the hazards of falling and implement procedures to be followed in order to minimize these hazards.

Retraining will be performed when an employee who has already been trained does not have the understanding and skill required by paragraph to recognize and control fall hazards. Circumstances where retraining is required include, but are not limited to, situations where changes in the workplace render previous training obsolete, or changes in the types of fall protection systems or equipment to be used render previous training obsolete, or inadequacies in an employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.

Training shall be performed by a competent person qualified in the following areas:

- The nature of fall hazards in the work area;
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
- The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used;
- The role of each employee in the safety monitoring system when this system is used;
- The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs;
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection; and
- The role of employees in fall protection plans;
- The applicable OSHA standards.

A written certification record of employee training will be maintained. The written certification record shall contain the name or other identity of the employee trained, the date(s) of the training, and the signature of the person who conducted the training.

### **5.2 GUARDRAIL SYSTEMS**

The top edge height of top rails, or equivalent guardrail system members, shall be 42 inches (1.1 m) plus or minus 3 inches (8 cm) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of this paragraph. Note: When employees are using stilts, the top edge height of the top rail, or equivalent member, shall be increased an amount equal to the height of the stilts.

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 21 inches (53 cm) high. Midrails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level. Screens and mesh, when used, shall extend from the top rail to the walking/working level and along the entire opening between top rail supports.

Intermediate members (such as balusters), when used between posts, shall be not more than 19 inches (48 cm) apart. Other structural members (such as additional midrails and architectural panels) shall be installed such that there are no openings in the guardrail system that are more than 19 inches (.5 m) wide.

Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890 N) applied within 2 inches (5.1 cm) of the top edge, in any outward or downward direction, at any point along the top edge.

When the 200 pound (890 N) test load is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches (1.0 m) above the walking/working level. Guardrail system components selected and constructed in accordance with the following specifications are deemed to meet this requirement.

(1) For wood railings: Wood components shall be minimum 1500 lb-ft/in(2) fiber (stress grade) construction grade lumber; the posts shall be at least 2-inch by 4-inch (5 cm x 10 cm) lumber spaced not more than 8 feet (2.4 m) apart on centers; the top rail shall be at least 2-inch by 4-inch (5 cm x 10 cm) lumber, the intermediate rail shall be at least 1-inch by 6-inch (2.5 cm x 15 cm) lumber. All lumber dimensions are nominal sizes as provided by the American Softwood Lumber Standards, dated January 1970.

(2) For pipe railings: posts, top rails, and intermediate railings shall be at least one and one-half inches nominal diameter (schedule 40 pipe) with posts spaced not more than 8 feet (2.4 m) apart on centers.

(3) For structural steel railings: posts, top rails, and intermediate rails shall be at least 2-inch by 2-inch (5 cm x 10 cm) by 3/8-inch (1.1 cm) angles, with posts spaced not more than 8 feet (2.4 m) apart on centers.

Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members shall be capable of withstanding, without failure, a force of at least 150 pounds (666 N) applied in any downward or outward direction at any point along the midrail or other member.

Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing. The ends of all top rails and midrails shall not overhang the terminal posts, except where such overhang does not constitute a projection hazard. Steel banding and plastic banding shall not be used as top rails or midrails. Top rails and midrails shall be at least one-quarter inch (0.6 cm) nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it shall be flagged at not more than 6-foot intervals with high-visibility material. Manila, plastic or synthetic rope being used for top rails or midrails shall be inspected as frequently as necessary to ensure that it continues to meet strength requirements.

When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section shall be placed across the access opening between guardrail sections when hoisting operations are not taking place.

When guardrail systems are used at holes, they shall be erected on all unprotected sides or edges of the hole. When guardrail systems are used around holes used for the passage of materials, the hole shall have not more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it shall be closed over with a cover, or a guardrail system shall be provided along all unprotected sides or edges. When guardrail systems are used around holes which are used as points of access (such as ladderways), they shall be provided with a gate, or be so offset that a person cannot walk directly into the hole.

Guardrail systems used on ramps and runways shall be erected along each unprotected side or edge.

### 5.3 SAFETY NET SYSTEMS

Safety nets shall be installed as close as practicable under the walking/working surface on which employees are working, but in no case more than 30 feet (9.1 m) below such level. When nets are used on bridges, the potential fall area from the walking/working surface to the net shall be unobstructed.

Safety nets shall extend outward from the outermost projection of the work surface as follows:

Vertical distance from working level to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet

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More than 5 feet up to 10 feet	10 feet
More than 10 feet	13 feet

Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified below. Safety nets and their installations shall be capable of absorbing an impact force equal to that produced by the drop test.

Safety nets and safety net installations shall be drop-tested at the jobsite after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place. The drop-test shall consist of a 400 pound (180 kg) bag of sand 30 + or - 2 inches (76 + or - 5 cm) in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than 42 inches (1.1 m) above that level.

When it is unreasonable to perform the drop-test a designated competent person shall certify that the net and net installation is in compliance with the above listed specifications by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the jobsite for inspection.

Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Defective components shall be removed from service. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system.

Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as possible from the net and at least before the next work shift.

The maximum size of each safety net mesh opening shall not exceed 36 square inches (230 cm) nor be longer than 6 inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6 inches (15 cm). All mesh crossings shall be secured to prevent enlargement of the mesh opening. Each safety net (or section of it) shall have a border rope for webbing with a minimum breaking strength of 5,000 pounds (22.2 kN). Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 6 inches (15 cm) apart.

#### 5.4 PERSONAL FALL ARREST SYSTEMS

Connectors in a fall arrest system shall be drop forged, pressed or formed steel, or made of equivalent materials. They shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

Dee-rings and snaphooks shall have a minimum tensile strength of 5,000 pounds (22.2 kN). Dee-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

Snaphooks shall be the self closing, self locking type.

Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged:

- Directly to webbing, rope or wire rope;
- To each other;
- To a dee-ring to which another snaphook or other connector is attached;
- To a horizontal lifeline; or

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- To any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

On suspended scaffolds or similar work platforms with horizontal lifelines that may become vertical lifelines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.

Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds (22.2 kN).

When vertical lifelines are used, each employee shall be attached to a separate lifeline. During the construction of elevator shafts, two employees may be attached to the same lifeline in the hoistway, provided both employees are working atop a false car that is equipped with guardrails; the strength of the lifeline is 10,000 pounds [5,000 pounds per employee attached] (44.4 kN); and all other criteria specified in this paragraph for lifelines have been met.

Lifelines shall be protected against being cut or abraded.

Self-retracting lifelines and lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less shall be capable of sustaining a minimum tensile load of 3,000 pounds (13.3 kN) applied to the device with the lifeline or lanyard in the fully extended position. Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet (0.61 m) or less, ripstitch lanyards, and tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN) applied to the device with the lifeline or lanyard in the fully extended position.

Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses shall be made from synthetic fibers.

Anchorage used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows:

- As part of a complete personal fall arrest system which maintains a safety factor of at least two; and
- Under the supervision of a qualified person.

Personal fall arrest systems, when stopping a fall, shall:

- Limit maximum arresting force on an employee to 900 pounds (4 kN) when used with a body belt;
- Limit maximum arresting force on an employee to 1,800 pounds (8 kN) when used with a body harness;
- Be rigged such that an employee can neither free fall more than 6 feet (1.8 m), nor contact any lower level;
- Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet (1.07 m); and,
- Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1.8 m), or the free fall distance permitted by the system, whichever is less.

The attachment point of the body belt shall be located in the center of the wearer's back. The attachment point of the body harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.

The employer shall provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves.

Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.

Body belts (to be used only as a positioning device) shall be at least one and five-eighths (1 5/8) inches (4.1 cm) wide.

Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists except as specified in other subparts of this Part.

When a personal fall arrest system is used at hoist areas, it shall be rigged to allow the movement of the employee only as far as the edge of the walking/working surface.

## **5.5 POSITIONING DEVICE SYSTEMS**

Positioning device systems and their use shall conform to the following provisions:

Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet (.9 m).

Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds (13.3 kN), whichever is greater.

Connectors used with positioning device systems shall be drop forged, pressed or formed steel, or made of equivalent materials. Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.

Connecting assemblies shall have a minimum tensile strength of 5,000 pounds (22.2 kN)

Dee-rings and snaphooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

Snaphooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member, or shall be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the snaphook keeper by the connected member. As of January 1, 1998, only locking type snaphooks shall be used.

Unless the snaphook is a locking type and designed for the following connections, snaphooks shall not be engaged:

- Directly to webbing, rope or wire rope;
- To each other;
- To a dee-ring to which another snaphook or other connector is attached;
- To a horizontal lifeline; or
- To any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional Disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

Positioning device systems shall be inspected prior to each use for wear, damage, and other deterioration, and defective components shall be removed from service.

Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

## 5.6 WARNING LINE SYSTEMS

Warning line systems and their use shall comply with the following provisions:

- The warning line shall be erected around all sides of the roof work area.
- When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge.
- When mechanical equipment is being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1 m) from the roof edge which is perpendicular to the direction of mechanical equipment operation.
- Points of access, materials handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines.
- When the path to a point of access is not in use, a rope, wire, chain, or other barricade, equivalent in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area, or the path shall be offset such that a person cannot walk directly into the work area.
- Warning lines shall consist of ropes, wires, or chains, and supporting stanchions erected as follows:
  - The rope, wire, or chain shall be flagged at not more than 6-foot (1.8 m) intervals with high-visibility material;
  - The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches (.9 m) from the walking/working surface and its highest point is no more than 39 inches (1.0 m) from the walking/working surface;
  - After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 N) applied horizontally against the stanchion, 30 inches (0.8 m) above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof, or platform edge;
  - The rope, wire, or chain shall have a minimum tensile strength of 500 pounds (2.22 kN), and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions described above; and
  - The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.
- No employee shall be allowed in the area between a roof edge and a warning line unless the employee is performing roofing work in that area.
- Mechanical equipment on roofs shall be used or stored only in areas where employees are protected by a warning line system, guardrail system, or personal fall arrest system.

## 5.7 CONTROLLED ACCESS ZONES

Controlled access zones and their use shall conform to the following provisions.

When used to control access to areas where leading edge and other operations are taking place, the controlled access zone shall be defined by a control line or by any other means that restricts access. When control lines are used, they shall be erected not less than 6 feet (1.8 m) nor more than 25 feet (7.7 m) from the unprotected or leading edge, except when erecting precast concrete members.

When erecting precast concrete members, the control line shall be erected not less than 6 feet (1.8 m) nor more than 60 feet (18 m) or half the length of the member being erected, whichever is less, from the leading edge. The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge. The control line shall be connected on each side to a guardrail system or wall.

When used to control access to areas where overhand bricklaying and related work are taking place:

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- The controlled access zone shall be defined by a control line erected not less than 10 feet (3.1 m) nor more than 15 feet (4.5 m) from the working edge.
- The control line shall extend for a distance sufficient for the controlled access zone to enclose all employees performing overhand bricklaying and related work at the working edge and shall be approximately parallel to the working edge.
- Additional control lines shall be erected at each end to enclose the controlled access zone.
- Only employees engaged in overhand bricklaying or related work shall be permitted in the controlled access zone.

Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:

- Each line shall be flagged or otherwise clearly marked at not more than 6-foot (1.8 m) intervals with high-visibility material.
- Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches (1 m) from the walking/working surface and its highest point is not more than 45 inches (1.3 m) [50 inches (1.3 m) when overhand bricklaying operations are being performed] from the walking/working surface.
- Each line shall have a minimum breaking strength of 200 pounds (.88 kN).

On floors and roofs where guardrail systems are not in place prior to the beginning of overhand bricklaying operations, controlled access zones shall be enlarged, as necessary, to enclose all points of access, material handling areas, and storage areas. On floors and roofs where guardrail systems are in place, but need to be removed to allow overhand bricklaying work or leading edge work to take place, only that portion of the guardrail necessary to accomplish that day's work shall be removed.

## **5.8 SAFETY MONITORING SYSTEMS**

Safety monitoring systems and their use shall comply with the following provisions.

The employer shall designate a competent person to monitor the safety of other employees and the employer shall ensure that the safety monitor complies with the following requirements:

- The safety monitor shall be competent to recognize fall hazards;
- The safety monitor shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner;
- The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored;
- The safety monitor shall be close enough to communicate orally with the employee; and
- The safety monitor shall not have other responsibilities which could take the monitor's attention from the monitoring function.

Mechanical equipment shall not be used or stored in areas where safety monitoring systems are being used to monitor employees engaged in roofing operations on low-slope roofs.

No employee, other than an employee engaged in roofing work [on low-sloped roofs] or an employee covered by a fall protection plan, shall be allowed in an area where an employee is being protected by a safety monitoring system.

Each employee working in a controlled access zone shall be directed to comply promptly with fall hazard warnings from safety monitors.

## **5.9 COVERS**

Covers for holes in floors, roofs, and other walking/working surfaces shall meet the following requirements:



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- Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.
- All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.
- All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.
- All covers shall be color coded or they shall be marked with the word "HOLE" or "COVER" to provide warning of the hazard. Note: This provision does not apply to cast iron manhole covers or steel grates used on streets or roadways.

### 5.10 PROTECTION FROM FALLING OBJECTS

Falling object protection shall comply with the following provisions:

- Toeboards, when used as falling object protection, shall be erected along the edge of the overhead walking/working surface for a distance sufficient to protect employees below.
- Toeboards shall be capable of withstanding, without failure, a force of at least 50 pounds (222 N) applied in any downward or outward direction at any point along the toeboard.
- Toeboards shall be a minimum of 3 1/2 inches (9 cm) in vertical height from their top edge to the level of the walking/working surface. They shall have not more than 1/4 inch (0.6 cm) clearance above the walking/working surface. They shall be solid or have openings not over 1 inch (2.5 cm) in greatest dimension.

Where tools, equipment, or materials are piled higher than the top edge of a toeboard, paneling or screening shall be erected from the walking/working surface or toeboard to the top of a guardrail system's top rail or midrail, for a distance sufficient to protect employees below.

Guardrail systems, when used as falling object protection, shall have all openings small enough to prevent passage of potential falling objects.

During the performance of overhand bricklaying and related work:

- No materials or equipment except masonry and mortar shall be stored within 4 feet (1.2 m) of the working edge.
- Excess mortar, broken or scattered masonry units, and all other materials and debris shall be kept clear from the work area by removal at regular intervals.

During the performance of roofing work:

- Materials and equipment shall not be stored within 6 feet (1.8 m) of a roof edge unless guardrails are erected at the edge.
- Materials which are piled, grouped, or stacked near a roof edge shall be stable and self-supporting.

Canopies, when used as falling object protection, shall be strong enough to prevent collapse and to prevent penetration by any objects which may fall onto the canopy.

### 5.11 FALL PROTECTION PLANS

This option is available only to employees engaged in leading edge work, precast concrete erection work, or residential construction work who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment. The fall protection plan must conform to the following provisions.

The fall protection plan shall be prepared by a qualified person and developed specifically for the site where the leading edge work, precast concrete work, or residential construction work is being performed and the plan must be

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maintained up to date. Any changes to the fall protection plan shall be approved by a qualified person. A copy of the fall protection plan with all approved changes shall be maintained at the job site. The implementation of the fall protection plan shall be under the supervision of a competent person.

The fall protection plan shall document the reasons why the use of conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety nets systems) are infeasible or why their use would create a greater hazard.

The fall protection plan shall include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who cannot be provided with protection from the conventional fall protection systems. For example, the employer shall discuss the extent to which scaffolds, ladders, or vehicle mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling.

The fall protection plan shall identify each location where conventional fall protection methods cannot be used. These locations shall then be classified as controlled access zones and operated accordingly.

Where no other alternative measure has been implemented, a safety monitoring system shall be implemented.

The fall protection plan must include a statement which provides the name or other method of identification for each employee who is designated to work in controlled access zones. No other employees may enter controlled access zones.

In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss) an investigation of the circumstances of the fall or other incident shall be performed to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and shall implement those changes to prevent similar types of falls or incidents.

## 6.0 REFERENCES

- 29 CFR 1926 Subpart M –
- [http://www.osha-slc.gov/OshStd\\_toc/OSHA\\_Std\\_toc\\_1926\\_SUBPART\\_M.html](http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_M.html)

## 7.0 ATTACHMENTS

None

## 8.0 RECORD KEEPING

- Employee training certifications
- Inspections of Safety Nets (when applicable)
- Fall protection plans (when applicable)

## 9.0 EQUIPMENT

- Personal fall arrest system components



